

COAL AGE

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Keeping Track of Delays

MECCHANICAL loading can be made a success only by proper supervision, especially when first established. The first study in the preliminary operation of machines is not to skin the attendance down to its lowest limits but to put enough men on the job to see what delays occur, and why. Young technical graduates are well suited to this effort. They take readily to the clerical work involved, and they have a keen interest in analyzing and diagramming the progress of the work. They are sympathetic to the advance that industry is making and feel an enthusiasm in being permitted to be among the first to turn over its pages.

Why Not Cut in the Clay?

A LETTER the other day called attention to the article on the operations of the Paris Purity Coal Co. and stated that the writer had decided to undercut his coal in the clay. One wonders why it is that this practice is not more general. Of course, the coal falls on a rough clay bottom if the company has not been wise enough to provide shoveling plates. Why are such plates, by the way, not more common? Metal mines use them, calling them "sollars," after the shoveling planks in shafts.

It might be necessary in wet places to make such sollars of non-corrosive material and to turn them up on end when they are not being used, but in many cases they would surely give cleaner coal and at less labor for shoveling. With our cry for less slack and more lump, undercutting in clay would seem a means of reducing financial losses. Perhaps in some union sections the men might be willing just now to give the operator a run for his money by trying out this method of economy, wherever, of course, the clay is found not to be too hard.

How Hungry Are Miners?

ONCE MORE we feel constrained to remind such Ohio and Pennsylvania operators as may be on the point of shutting down their mines so as to offer the 1917 scale that they have a contract with the United Mine Workers of America. A contract is a contract, and it ought to be kept. If abrogation of it generally throughout the eastern half of the Central Competitive Field is to be the result of the failure of the operators to hold their Cleveland conference March 17, then we tremble for the future of labor relations between operators and miners in this country.

Of course the mine owners of the union regions are facing an impossible condition when they try to operate under the Jacksonville agreement. They simply cannot operate without giving their coal away and that course cannot continue long with solvency. But a contract has been signed. Under it union miners can hardly get any work at all. They are getting hungry

in various quarters of the nation. The time will come when they cannot longer be kept workless. They will insist upon work at a fair wage. Then and then only will it be possible for the wage status of union mines to be changed honorably and effectively. A change now, forced by the operators, is more than likely to wind up with some sort of unsatisfactory compromise.

Operators who believe their men are crying for work at any price may possibly be fooling themselves—now that summer is approaching with good fishing days. If they deliberately put themselves into the position of having scrapped a contract—and their men refuse to work or are deterred from so doing—they stand before the nation shameless.

We contend abrogation of contract is not essential. There are many reasonable men among the Mine Workers—even among the officials. Reason eventually will prevail in this travail if only the operators of this country have intestinal strength enough to endure the pain awhile longer.

Simplification and Concentration

IF THE MINING machine and the mechanical loader are not sufficient to bring us to long-face methods of mining, the needs of ventilation, supervision and drainage will do so, and that before long. Especially important is the former—ventilation—as we get larger mines with more men and more gas. The old advancing longwall resulted in much loss of air through the gob packs, but with retreating longwall the air has a definite course provided and a simple one—along a solid aircourse between coal ribs, then in front of a longwall face to another aircourse, also defined by ribs of coal. There is no occasion for leakage and no necessity to keep splitting the current till it no longer has ability to scour away the gas.

In the narrow work necessary to start the longwall faces, booster fans and conduits will doubtless be adopted. Where only a few narrow places have to be driven, it will be easy to provide that the air will be used at a limited number of working faces. In fact the number of such faces will itself be limited, whereas now in a panel of rooms there are many and a small part of the main air current circulates past them all.

A booster fan provided for each single working face is not, it must be admitted, just exactly scientific perfection. It is apt to use the air that has been used before, but we lose a little of our horror at such a possibility when we reflect that in a range of rooms a small quantity of air is caused to serve all of them. The booster fan has a higher aim than it attains, but the ventilation of room faces in the customary manner by a current which is shared unequally with that in the entry not only fails in attaining its end, which is to circulate enough air, but has at best an imperfect purpose, for it contemplates using that air for an excessive number of places.

We think the booster fan should be given a better

reception by the inspectorate. It has been condemned by many inspectors without due consideration and without trial. The law requiring frequent crosscuts militates against the use of the booster fan, with the result that less perfect ventilation is provided. With such a fan it would be possible to ascertain that every man actually got the quantity of air the law requires, whereas at the working faces and at the crosscuts between working faces there is now rarely that quantity of air, and often the anemometer can measure no current whatsoever. There is enough in the panel entry but pitifully little where the gas is thickest and the men are congregated. In the effort to obtain something technically perfect we continue practices which are based on extremely faulty principles and cannot be made to give nearly such good results as those furnished by the methods condemned. A little independent thinking, therefore, is needed.

Commercial Engineers

ALL ENGINEERING men make their technical training and experience a source of income. So in a sense all mining technicians are commercial engineers. But of course a man may work for a coal company and not a manufacturing corporation, and so group himself with a line of excellent men—whose names for the most part are forgotten. On the other hand, he will miss the glory of being associated with such men as James Watt, George Stephenson, Thomas Edison, Charles Steinmetz, and George Westinghouse—who have sold or are selling mechanical devices.

The mining and civil engineering schools at colleges look askance at the commercial engineer. Needless to say, the mechanical schools have a better appreciation of such men. If it had not been for the mechanical devices created and sold by the commercial engineer, your mining man would still be using a stone pick and a wooden shovel. There's a trifle too much snobbery in the mining engineering profession. Of course, what is said about the mechanical engineer refers to real engineers and not to those who merely pose as such. The latter are really not one whit more scientific than many transit toters.

Full-Grown Men

WHEN MEN, even full-grown men, sign a bond, they can agree to tear it up when they find its terms oppressive, and those who threatened and cajoled them to sign it can without any impropriety of conduct urge on both parties to the agreement a revision of the bond. Macaulay heaps scorn on the man who is bound by a promise that no one wants him to fulfill. Others have condemned the consistency that prevents a man from recognizing that he has made an error.

If the operators and miners should both want a revision of their contract, why should they not provide one? That they were grown men when they made the bond does not prevent them from together revising their judgment or reassuming the right to do as they please. Nor is Washington which advised the agreement bound to advocate its continuance or to refrain from stepping in to urge its revision as strenuously as it once advocated that the pledge be made. Furthermore the government so doing would not set any worse precedent than it did when it advocated the breaking of an agreement a few years back—at that time in

favor of the miners who refused to work and keep their pledge to the operators.

Of course, any such mediations even accompanied by the "persuasion" of Washington might do no good. The miners are not as readily coerced as the operators. We believe in fact that mediation would be useless. That is the reason, if there is one, that it should not be attempted. But for Washington to say the operators and miners are "grown men" and should not agree to void a pledge that ruins and impoverishes both and that an unholy precedent would be established if the pledge were revised with both parties assenting is to misapprehend the facts.

Playing with a Boomerang

ALTHOUGH the expiration date of the wage agreement in the anthracite region is still five months distant, salesmen of the school of fear have begun to whisper "strike" to prod reluctant buyers into action. Some retail coal men are using strike talk to scare dilatory householders into laying in their usual supplies of fuel during April and May. Some wholesalers are also employing similar "arguments" in an effort to fatten their order books. It is a time-honored device that has moved tonnage in the past—and those whose mental processes work backward can see no harm in relying upon it again.

Nevertheless it is about as dangerous a method as could be employed. To begin with, in the present case it squares neither with the facts nor the probabilities. Until the demands of the anthracite miners are known, it is not even well-reasoned conjecture. Nobody with the best interests of the hard coal business at heart wants another labor disturbance. Certainly the operators have nothing to gain by a strike if the men are willing to renew the present contract. The producers, of course, would like to see wages reduced so that prices might be lowered and anthracite could be placed in a stronger competitive position. But, unless there should be unexpected upsets before Sept. 1, there is no foundation for any expectation that the union will voluntarily accept a cut.

To force a reduction by suspending operations when the existing agreement expires is not in the realm of possibilities. The day when that could be done has gone. Long before grim necessity had compelled the workers to make terms with the producers, public and political clamor would have grown so loud that the federal government or a Mr. Pinchot would step in with another hodge-podge arrangement to which the producers would have to acquiesce. All the operators would have for their pains would be heavy financial losses and more firmly entrenched competition from rival fuels. Such alternatives are not pleasant to contemplate, perhaps; but they are, nevertheless, the brutal facts of the situation.

Even were these facts otherwise, it would still be dangerous to advance strike threats to induce early buying. Nothing that we can imagine would suit the oil people better. Nothing would give them a stronger talking point with domestic consumers than fear that there might be a serious interruption to the mining of hard coal this fall or winter. "Put in your oil burner this spring and be free from worry" would be their slogan. With oil competition in the domestic field what it is, strike talk as a coal sales argument is something worse than folly.

At Pocahontas Fuel Co.'s Mines, Machines Load Forty per Cent of Output

Twenty-two Machines Loaded 1,500,000 Tons—Each Consistently Yields 300 to 350 Tons per Nine-Hour Shift—Drawslate Found in 90 per Cent of the Area and Is Frequently Quite Thick

By Alphonse F. Brosky,

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MECANICAL LOADERS handled about 1,500,000 tons, or 40 per cent of the 3,700,000 tons of coal produced by the Pocahontas Fuel Co. in 1924. As the leading producer of mechanically loaded coal, this company is far ahead of the runner-up for this honor, and for some years to come may continue to lead by reason of its purpose to substitute machine-loading for hand-loading methods in all its mines.

These mines are located in West Virginia and Virginia and on the southern boundary of the Pocahontas field. The machine being used is the Coloder, the first modern machine of this type being placed in service in 1918. Since then the company has installed twenty-one additional machines; all of them are now working and others will be installed from time to time. For a detailed description of this machine the reader is referred to the Feb. 5 issue of this magazine, p. 215-218.

The rate at which loading machines are supplanting miners in the operations of this company is indicated by the growth in the tonnages of machine-loaded coal in the last five years. Thus in 1920 about 200,000 tons were produced by machines; in 1921 about 320,000 tons; in 1922 about 650,000 tons; in 1923 about 1,000,000 tons and in 1924 about 1,500,000 tons. The significance of this rapid growth is better displayed by the graph in Fig. 1. Particular interest lies not only in the fact that the yearly production of machine-loaded coal grew steadily during this period, but also that the rate of growth for each successive year increased.

Of the twenty-two Coloders installed in these mines, twenty-one were in service in October of 1924 and pro-

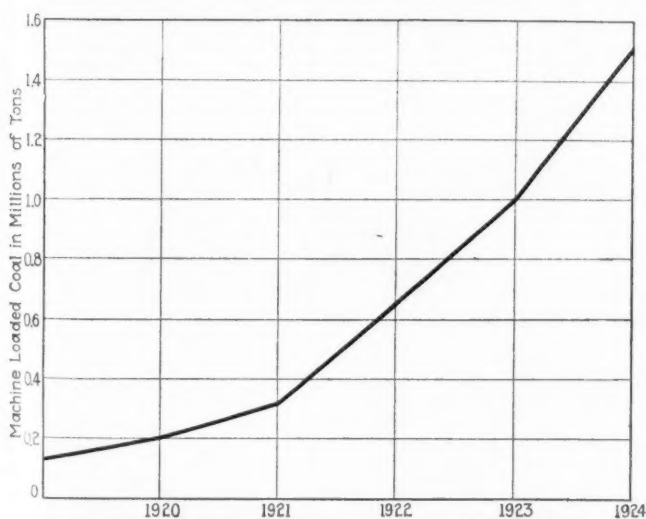


Fig. 1—Growth of Production by Loading Machines

The production of machine-loaded coal from the mines of the Pocahontas Fuel Co. is growing rapidly, as the graph indicates. This production has leaped from 200,000 tons in 1920 to 1,500,000 tons in 1924. The rate of growth is constantly increasing, and before long all the coal produced by this company is likely to be loaded by machines.



Fig. 2—Loaded 705 Tons in 11½ Hours

From left to right, the men seated on the Coloder are: L. H. Carter, mine foreman; Tom Murray, runner of machine No. 113, and Robert W. Wallace, superintendent—all of the West mine at Pocahontas, Va. Mr. Murray and his machine crew on June 11, 1923, loaded 705 tons of coal in 11½ hours, establishing a world's record for coal-loading.

duced 156,800 tons. As there were twenty-six working days in this month, the average output per machine per day of nine hours was 287 tons. These machines worked in coal ranging from 7 to 10 ft. in thickness—in rooms, pillar sections and entries—in some places under favorable conditions and in other places under those that were unfavorable.

LOADS 478 TONS PER DAY

A few machines averaged considerably more than 287 tons per day during this month, and a few less. One machine loaded 12,433 tons, or an average of 478 tons per day. On two-thirds of the working days it was double-shifted, working forty-three shifts of nine hours each and producing 289 tons per shift. Two other machines following the same schedule each loaded about 11,400 tons.

In another month one machine in double shifts loaded 8,100 tons while driving an entry, its aircourse and a breakthrough. To accomplish this feat each place was twice cut, shot and loaded in each shift. A cut measured 7½ ft. high, 12 ft. wide and 7½ ft. deep.

The best example of the machine's ability to load coal was established on June 11, 1923, in the West mine at Pocahontas, Va. On this day Machine No. 113 loaded 705 tons in 11 hours and 10 minutes. It worked in

rooms, headings and crosscuts and on pillars. Working off the butt of one pillar, this machine that day loaded 110 tons in one hour. The rate of loading for the over-time-shift was 63.2 tons per hour. An 8-hr. shift based on this rate would yield 506 tons; a 9-hr. shift would yield 569 tons.

In the mines of this company, the Pocahontas No. 3 seam is being worked in every instance, but the thickness of the coal and the nature of the roof, nevertheless, vary considerably. The coal is from 4½ ft. to 13 ft. thick, the general thickness over the entire area being from 7 to 10 ft. Soft and columnar in structure, it is difficult to obtain from it any large percentage of lump in preparing the coal for machine loading. The roof is composed in general of shales which disintegrate readily, and for this reason top coal is left in some places to hold the roof.

SLATE PARTING IN DELTA MINE

In the Delta mine a parting of blue slate, quite thin in places, separates a 2-ft. rider seam from the main body of coal being mined. This slate parting thickens in a general direction southwest and in certain areas gives way to a hard, stratified sandy formation which, strictly, is neither a shale nor a sandstone. As this rock formation between the coal seam proper and the rider seam thickens, the latter feathers out and may disappear entirely. This relative change in the thickness of the parting and the rider seam is accompanied in restricted areas by a thinning out of the main seam which averages 7 ft. in thickness.

Only about 10 per cent of the area worked out in the mines where loading machines are being used by this company is entirely free of drawslate. To be sure, at points it is no more than a scale, but at other points it may be 2 ft. thick. The average thickness of this slate is about 5 in.

ENCOUNTER STEEP GRADES

The headings and rooms are generally flat or have only slight grades. However, in some places the grades are steep as, for instance, the dip workings near the crop in the Pittsburgh section of the Shamokin mine. The grade of one room in which the Coloder was operated was about 18 per cent. In spite of this adverse grade 3½-ton mine cars were loaded in an average of 2 minutes even though the place was not wide and the front end of the loading machine worked under water to a depth of about 6 in. The mine cars were shifted to and from the face of this room in 1 to 1½ minutes.

This company is mining on the room-and-pillar plan with only such modifications as are required to facilitate the work of the loading machines. These will be mentioned later. Rooms are driven 18 to 21 ft. wide and 400 ft. long. The old rooms were driven on 60-ft. centers but those in the new work are laid on 80-ft. centers. A typical working section taken from the Boissevain mine map is shown in Fig. 3. Practically all of this section has been developed and mined with loading machines, including the pillars, which the map shows as having been drawn.

Pillars are, and for several years have been, suc-

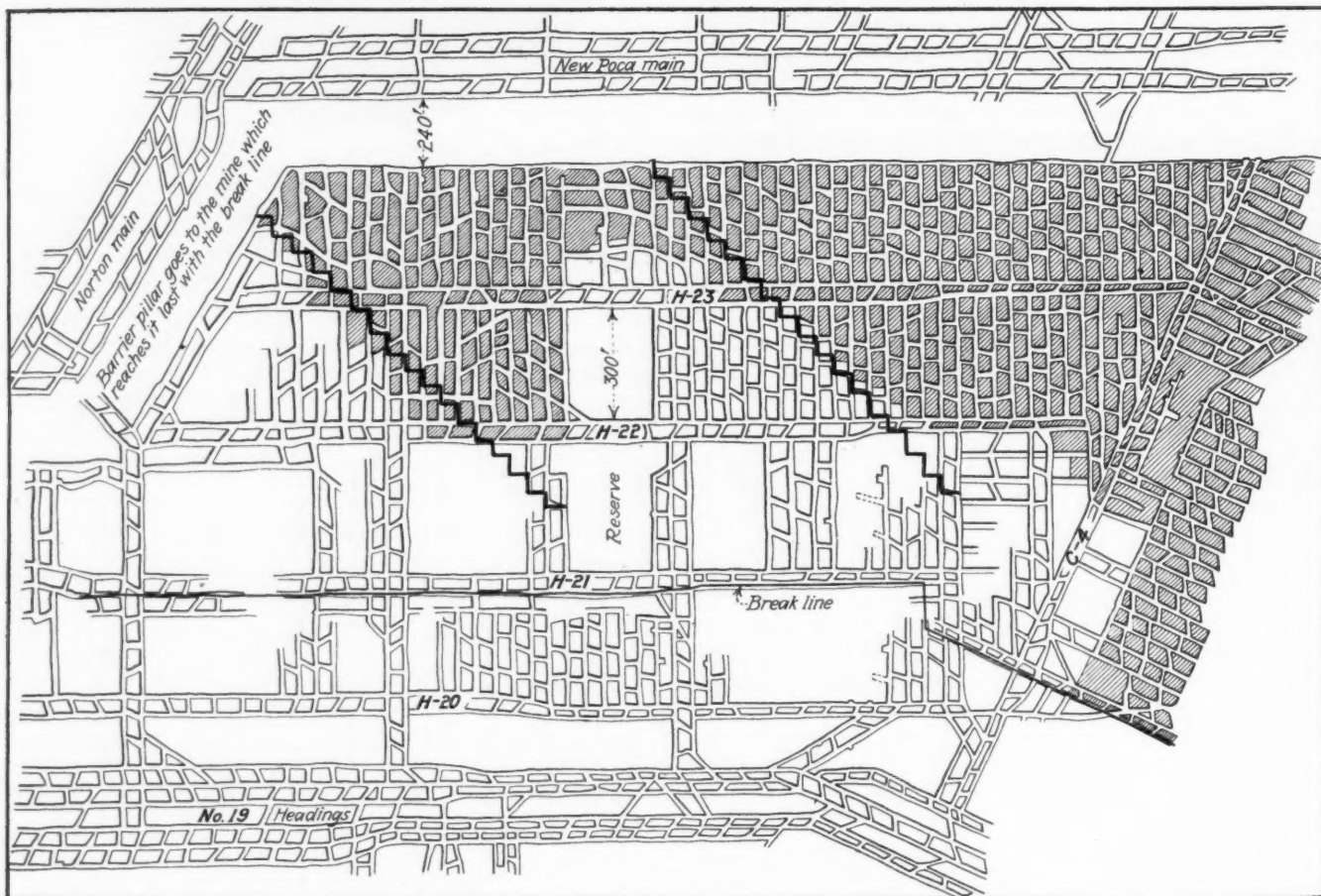
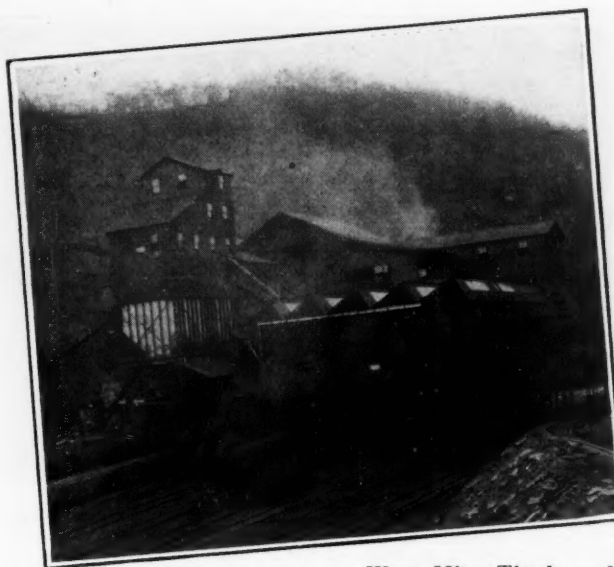


Fig. 3—Section of Boissevain Mine, Pocahontas Fuel Co., Showing Area of Coal Loaded by Machine

Practically all the territory shown has been developed and worked out by loading machines, including, of course, the pillars. In the past, rooms have been driven 400 ft. long and 20 ft. wide on 60-ft. centers.

New rooms are now being driven equally as long and wide but on 80-ft. centers. The practicability and economy of pillar recovery by loading machines, as borne out in actual practice, has dictated the projec-

tion of wide room centers. Note the systematic layout and sequence in drawing pillars—so far as conditions will permit. By such methods are guaranteed concentration, high recovery and economy.



West Mine Tipple and Machine Loading Neck

Fig. 4—The capacity of this tipple is about 4,000 tons per day. The large roof surface of this structure covers not only usual preparation equipment but a washer as well, for cleaning medium sizes. The slate bank on the right, only the lower end of which is shown, is a small mountain in itself and gives some idea of the quantity of slate which must be handled at this mine. From 75 to 100 mine cars of slate each day are dumped. Rockmen remove drawslate for it is safer down than supported by props.

Fig. 5—The machine is shown loading a neck cut for No. 1 room off No. 28 heading in the Norton Main section of the West mine. The relative positions assumed by the five men comprising the machine crew are indicated. Large lumps of the size lying near the front end of the machine can be handled, but naturally retard the rate of loading and cause trouble in the tipple chutes. Correct preparation for machine loading, when finally achieved, will produce lumps of medium size.

cessfully extracted in these mines by methods in which loading machines take the place of miners. Where loading machines are used, the area of live workings for a given output is about one-third that required when hand-loading methods are used. The extraction is so swift that few timbers are required and these need no resetting; less slate is handled and more lump coal is obtained because less weight settles on the coal in pillar sections.

Pillar coal can be loaded by machine at lower cost than by hand. In fact, the Pocahontas Fuel Co. claims the cost of pillar coal, excluding the cost of timbering, is no more and possibly may prove to be less than the cost of room coal where, in each case, loading machines are being used. It has vindicated this claim by increasing the width of its room pillars.

MACHINES INCREASE SPEED AND SAFETY

Safety in pillar work is greatly increased by loading machines. With hand-loading methods no more than two men can work in a split or on a stump of a pillar. The mine cars have an average capacity of $3\frac{1}{4}$ tons. Four of these constitute a fair day's work for one miner in a pillar section. Consequently two men will recover only about 26 tons of coal from one pillar per day. By loading one and sometimes two cuts from one pillar in a shift, it is possible to increase the output from that pillar to as much as 100 to 200 tons per shift, the quantity being dependent on the method of working whether off the butt or by splitting the pillar and removing the stumps. By machine methods, consequently, the coal is removed as much as eight times as fast as by hand. In proportion to this increased speed is the safety increased. Speed also assists by reducing the quantity of slate to be handled and by decreasing the number of timbers that must be set. The claim for greater safety in machine loading is substantiated by the fact that not a man on a loading-machine crew has been fatally injured, though, in the last five years, the machines at these mines have loaded over $3\frac{1}{2}$ million tons of coal.

Two reel-type gathering locomotives are kept in at-

tendance on each Coloder. By this means, under normal conditions, mine cars can be shifted in 20 to 90 sec. To expedite the shifting of mine cars to and from the faces of entries and aircourses that are being advanced by loading machines, it is customary to lay a turnout in the entry and make track connections with the aircourse through crosscuts. Inasmuch as entries are driven 16 to 18 ft. wide there is sufficient space for the turnout which is made long enough to accommodate six mine cars and a locomotive. The turnout is shifted ahead at intervals of about 250 ft. The same track arrangement is being utilized under certain circumstances in the driving of rooms, in which case, however, the turnout is laid in one of a pair of rooms.

REQUIRES LITTLE TIMBERING

Neither in rooms nor in entries is much timbering required. After a place is cut and shot, a slate crew pulls down whatever loose slate hangs over the pile of coal, separates this slate from the coal and gobs it. Timbers are set at comparatively few points in rooms and entries and their absence at working faces enables the loading machine to work at a faster rate than it otherwise would. It is safer to take down slate than to prop it.

The Pocahontas Fuel Co. officials believe pillars can be successfully drawn by successive 45-deg. cuts on the butt end. This work has been carried out far enough to assure its practicability, especially in the Delta mine where this system is being used extensively. A 45-deg. cut on the end of a 40-ft. room pillar is 55 ft. long. When rooms are driven 20 ft. wide on 80-ft. centers, as is the practice in the newer workings, end cuts can be provided on an angle of 45 deg. which will be 85 ft. long. Each of these cuts with a kerf of 8 ft. in a thickness of 8 ft. of coal will yield a little more than 200 tons.

I inspected a face of this kind in the Delta mine. It was about 60 ft. long. A center cut was made to a depth of 8 ft. dividing the face into two equally thick benches. As is customary, the bottom bench was shot first and the top bench last, by two rows of holes placed



Fig. 6—Machine Loading a Lift from a Pillar

The Coloder loads as readily from a pillar as from a room. When the roof is bad a relatively narrow place is driven through the pillar leaving a stump or wing which is later removed by the same machine. By cutting the pillar off the end and at a 45-deg. slope a long face can be obtained. The machine is shown here in a position parallel to a 60-ft. face on the end of a room pillar. The cut being loaded yielded over 100 tons of coal. Such large tonnages in single loadings make shovel shifts infrequent.

1 ft. from the roof and floor and slanted upward and downward respectively. The holes in the top row were seven in number, on about 8-ft. centers, and each of these was charged with two sticks of permissible explosive. In the bottom bench each of 14 holes on about 4-ft. centers was charged with three cartridges of Monobel. All the holes were shot, one at a time, by a battery.

Timbers on 4-ft. centers in rows on 4-ft. centers were set parallel with the face. The foremost row of timbers was set 11 ft. from the face of the cut or 19 ft. from the solid coal. The track in the room on the protected side of the pillar was turned parallel to the face and extended by short rail lengths to conform with the advances made by the machine in loading the coal.

Where conditions will not allow pillars to be drawn "open-ended," wing pillars are split off the main body of the pillars by places which are usually driven about 16 ft. wide. These wing pillars are brought back as a unit, or pocketed, as conditions may require.

The company is experimenting continually with preparation methods and arrangements for facilitating the work of the Coloder. Big lumps in large numbers

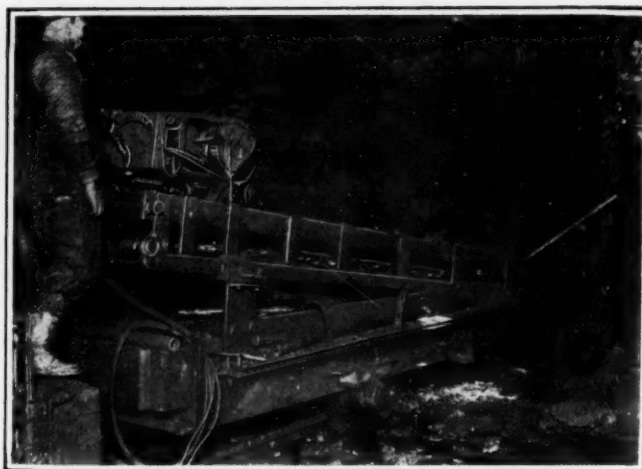


Fig. 7—Snubbing Machine Makes Kerf Wedge-Shaped

A breast machine is guided forward and downward on a slope which provides a perfect snub cut with a minimum of labor. The wedge of coal left between this angular cut and the floor is then lifted by bars and withdrawn with shovels and picks. Of course this can be done only in coal of about the same degree of softness as the Pocahontas No. 3 seam. An 18 ft. wide place is cut in 40 minutes and the wedge removed in 20 minutes. The snub cut makes the coal roll over.

necessarily retard the speed of loading and to solve this problem without increasing the quantity of slack produced, experiments in cutting and shooting are under way. Shearing cuts, as a solution to this problem, are proposed and will be tried. Perhaps a center shear will accomplish the desired purpose; if not, two rib shears in connection with a horizontal center cut will be tried. In either case an attempt will be made to employ light pop shots at strategic points to eliminate big lumps and excessive slack.

SNUBBING NOT UNCOMMON PRACTICE

Snubbing is in comparatively common use in the mines of this company. Especially does this practice prevail in the West mine where a breast machine has been reconstructed so as to make a cut at the required angle. This machine appears in one of the accompanying illustrations. It cuts from a position on the track. The truck of the machine is mounted on 10-in. wheels and carries an inclined frame on which the cutting gear operates. The cutterbar is fed forward mechanically and cuts a kerf which slopes toward the floor. It is



Fig. 8—Two Trips of Machine-Loaded Coal Emerging from the Drift Mouth of the West Mine

In the near future all trips coming from the mines of this company will carry machine-loaded coal. They will be recognized by large mine cars, which will not be topped so as to overflow

the sides. The building of coal on the tops of cars will cease when machines are generally introduced. As a result less coal dust will be formed on the mine roads.

3½ ft. wide on the front end and 10 ft. long. The time required by this machine to cut a place 18 ft. wide is about 40 minutes. Bars, picks and shovels are utilized to break out the wedge of coal between the inclined kerf and the floor. Inasmuch as this work is accomplished in about 20 minutes, the entire job of making a snub cut is completed in one hour.

The number of men required depends on conditions. Including the loading-machine crew, 18 to 25 men perform all the duties incident to the mining of 275 to 350 tons of coal, which is the output per 9-hour shift being obtained regularly by each of the 22 Coloders in these mines. Not only do these men mine this tonnage of coal, but they also place it on a sidetrack in the main heading. The labor attached to one loading machine unit comprises: A loading-machine crew of five men, two motormen, two brakemen, one cutting-machine man and his helper, two trackmen, two timbermen, one boss, the part-time services of one electrician and where slate has to be taken down in large quantities additional men also for that purpose—usually three to five.

11 TONS PER MAN PER SHIFT

As a conservative estimate let us take the lower limit of production (275 tons per shift) and the higher limit of labor (25 men), and it will be seen that 11 tons per man per shift is the result. However, last year the loading machines working in seven mines and producing 1,500,000 tons attained a production of more nearly 12 than 11 tons per man. The real significance of the record can only be appreciated when the total tonnage on which it is based and the number of mines which took part in that production is considered.

Outstanding one-day records of high output for individual machines are not the basis on which the success of mechanical loading in these mines is based, but rather the day-in and day-out, year-in and year-out performance of not one, but all the machines in use. The consistent and ever-increasing efficiency in mass production is more vital than the best individual record.

The average delay per machine per shift, due to its own failure, in 1924 was 14.3 minutes, the average delay per machine per shift during the month of December of that year was 11 minutes, during one month in 1923 the delays due to machine failure averaged 9 minutes per machine per shift. The cost of supplies and labor in the repair of the twenty-two machines in the first ten months of 1924 when distributed over the tonnage produced in that time amounted to

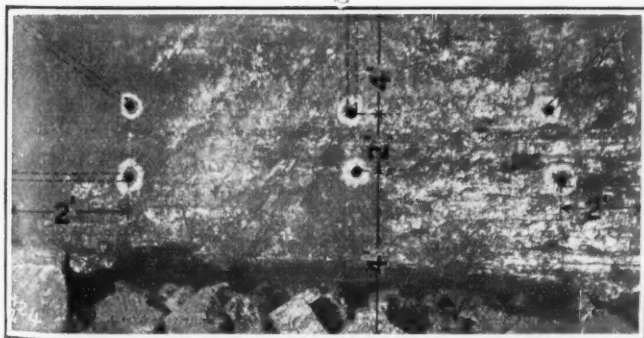


Fig. 9—Snub Cut Ready for Shooting

With the machine which cuts a sloped kerf, snubbing is accomplished without the usual yield of excessive small sizes. This cut is 17 ft. wide, 10 ft. high and 7½ ft. deep. The height of the snubbed kerf in the front is 15 in. and in the rear 7 in. The holes are pointed in the direction shown by the dotted lines, and are each charged with 1½x22 in. of black powder. The lower hole in the center goes in horizontal and at right angles to face.



Fig. 10—Result of Shooting Snub Cut

At best, it is extremely difficult to shoot soft coal without creating much slack. Snubbing aids appreciably in the elimination of this difficulty and prevents the cut from holding to the ribs and face. Not only that, but it also causes the coal to roll out and thus facilitates in the work which a loading machine must do.

2.6c. per ton. Incidentally, the power consumption per ton of coal loaded is 0.2 kw.-hr.

Several factors, the outcome of actual experience, govern the policy of the Pocahontas Fuel Co., which calls for the substitution of loading machines for miners and the complete mechanization of new mines, two of which are now being opened. Of first importance to continuous and economical production are uniformity of tonnage and low cost per ton, which loading machines afford. Much greater concentration is effected by the use of loading machines and this results in closer supervision which, in turn, brings about higher recovery, greater safety and better preparation.

On the strength of its experience in mechanical loading this company is laying plans to mine mechanically a large body of coal comprising the Faraday lease, which it recently acquired from the Frick estate. This property contains 29,000 acres of Pocahontas No. 3 seam coal ranging in thickness from 4 to 8½ ft. It is estimated to contain about 50 million tons of coal. Two mines, each with a daily capacity of 3,500 tons, are now in the early stages of development.

Electric Shotfiring Vs. Use of Fuse

There are many advantages in shotfiring by electricity. In wet holes misfires are often caused by water penetrating the fuse and damaging the powder or leaking into the cap. Electric shotfiring eliminates this cause of misfires. Electric blasting caps resist water in wet holes and do not deteriorate, when stored in damp places, as rapidly as open blasting caps.

Electric shotfiring is particularly well adapted for most shaft sinking. Lighting a round of holes in a shaft is no child's play, even under the most favorable conditions. Seconds are apt to seem like minutes, and it is only natural that the shotfirers should try to give a signal to the engineer to hoist them out of the shaft in as short a time as possible. If the fuse gets wet on the end, if the lights are extinguished by water dripping down the shaft, or if anything else unforeseen occurs to cause delay, misfires usually occur. When shots are fired electrically, there is ample time to make all connections properly.

From article on "Shotfiring by Electricity" presented by N. S. Greensfelder to the American Institute of Mining & Metallurgical Engineering.

Making Underground Pictures Without Danger of Flashing

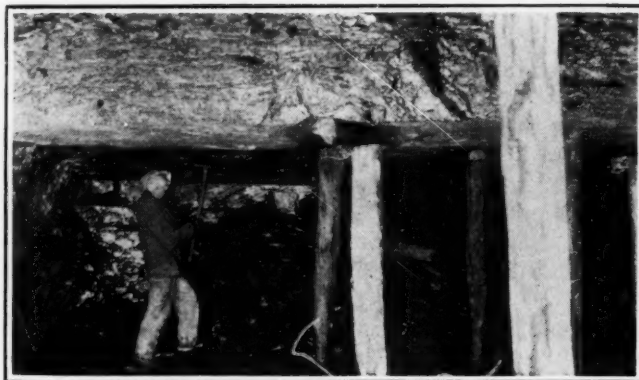
BY W. C. HOLMAN

Chief Engineer, Phelps Dodge Corporation, Dawson, New Mex.

Forward-looking coal-mining companies are continually doing things underground, an accurate record of which is of value. Photographs often would be an essential part of that record. But too often the mine is gaseous and the flashlight cannot be used with safety. To overcome this difficulty and still get the pictures the Phelps Dodge Corporation uses an electric lighting equipment for underground photography at the Stag Canyon mines grouped near Dawson, New Mex., where no open lights of any kind are permitted. The outfit and method might be followed by other coal-mining companies.

The apparatus used for lighting consists of six 200-watt, 250-volt Mazda daylight lamps. Each lamp is connected to a socket, which is attached to a white enameled tin reflector 18 in. in diameter and mounted on a wooden adjustable standard. Two wires about 20 ft. long are attached to each standard. One serves to connect to the trolley line. The other is used to ground to the rails. For carrying the current into the rooms or back entries an extra heavy cable is used. As many lamps as are required can be connected to this.

In placing the lamps, the operator makes certain that the light is evenly distributed and that the lamps do not



Few Shadows in This Picture of the Underground

The electric lighting outfit, properly placed for a time exposure, enabled the photographer to get a clear view of roof testing in spite of a forest of props and in spite of the tremendous light absorptive power of the black coal walls. A 2-minute exposure with the shutter "stopped" at F8 was sufficient in this case.

produce shadows. The opening of the shutter and the time of exposure of course vary, depending upon the subject. With subjects likely to move, a stop of F8 and an exposure of two minutes is used. For all other objects, either a stop of F16, with five minutes exposure, or F32 with an exposure of 10 to 12 minutes is found most effective.

For some of the set-ups where it serves the purpose a dummy is used instead of a miner. The pictures taken by means of electric lamps are far superior to those exposed by the ordinary flashlight.

Brick and Steel in Sunday Creek Mines

Some twenty-five or thirty years ago large acreages were mined up to a fault in mines Nos. 8 and 11 now belonging to the Sunday Creek Coal Co., Corning, Ohio. Then the mines were abandoned, leaving the pillars undrawn. Figs. 1 and 2 shows views in the connecting entry between these mines which are now being actively operated. A new tippie was built about the year 1922 at No. 8 mine and after six months' pumping production was started by drawing the old pillars and stumps. Although 1,200 tons of coal per day is now being loaded from this source, the new tippie was built primarily

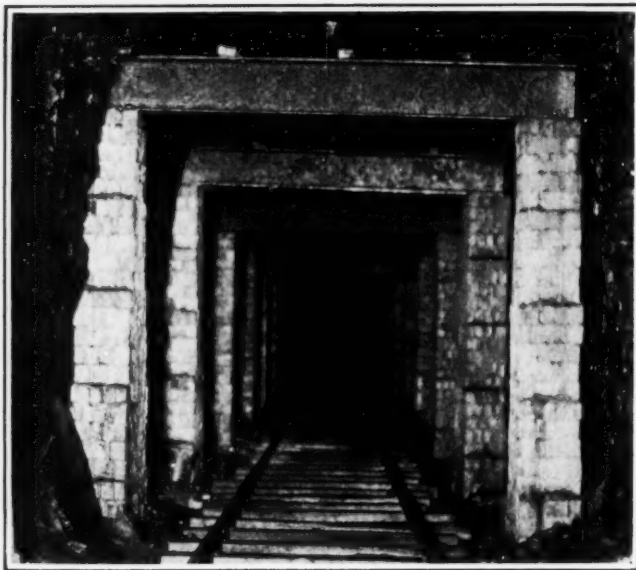


Fig. 1—Brick Pillars and Heavy Beams, Corning, Ohio

In the entry connecting No. 8 and No. 11 mines of the Sunday Creek Coal Co., these solid supports have been erected on footings of concrete.

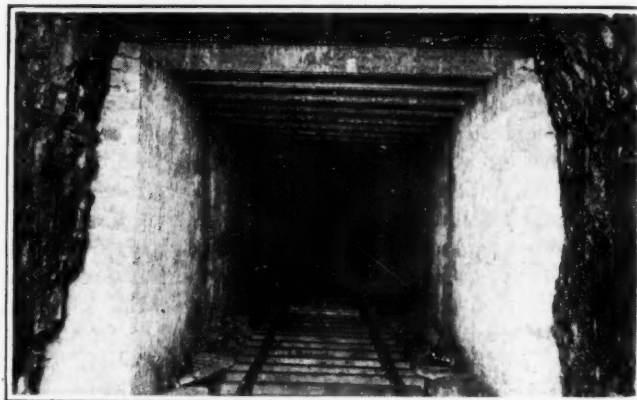


Fig. 2—Bridge Under Railroad and River, Corning, Ohio

This tunnel is 50 ft. below the surface, but as a railroad and a river cross at this place, the tunnel is a sort of bridge for both and is protected by walls and steel beams. In this, and in the preceding picture note the cleanness and solid structure of the coal.

for handling the coal from a 2,500-acre area which lies untouched beyond the fault.

The new entry from mine No. 8 to mine No. 11 is part of the plan for hauling the coal from the virgin area. The sets shown in Fig. 1 are placed on 10-ft. centers. The brick piers are 13x30 in. at the bottom and 13x12 in. at the top. Because of the mine bottom being fireclay these piers are set on concrete footings. The I-beams used are 12 in.x9 ft.

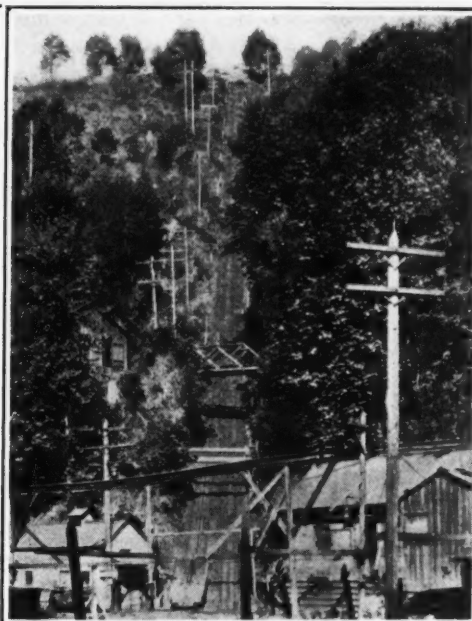
The tunnel shown in Fig. 2 is a 140-ft. section of the connecting entry under Sunday Creek and the main line of the Toledo & Ohio Central R.R. The continuous 13-in. brick walls are set on concrete and the 12 in.x9 ft. I-beams are set on 24-in. centers. There is only about 50 ft. of cover over the coal at this point. As will be noted from the illustrations the coal in this No. 6 seam is quite high. In mine No. 8 it will average about 8 ft. in thickness and runs as high as 12 and 13 ft. in places.

Carbonado Mine Works Two Pitching Seams Separated by Fragile Rock

Open Up Coal by 3½ x 4-Ft. Chutes—Experiments in Pillar Drawing—How to Avoid Accidents in Chute Starting

By S. H. Ash

Superintendent, Pacific Coast Coal Co., Carbonado, Wash.



Incline at Carbonado

ON THE NORTH and east side of the Carbon River, at Carbonado, Pierce County, Washington, seam No. 3 (Fig. 1) is known as the Big Ben and is a high-grade coking bituminous coal. Operations were started on the seam in the West Douty measures in the southwest quarter of section 4 and extend south into the north-east quarter of section 9.

On this side of the river, an average section of the seam has 5 ft. 6 in. of coal in the top bench, 5 ft. 4 in. in the lower bench and 7 ft. 7 in. of parting, which is mostly shale (see Fig. 6), although it contains some bony coal and carbonaceous shale. This parting must be left in the mine as it constitutes waste that would be prohibitively expensive to transport and remove in the cleaning plant. The hanging and foot walls are both good; and if it were not for the extreme thickness and the pitch of the seam and the inability to gob the waste, the ordinary prop and cap, or single stick, method of timbering and working would fill all requirements so far as the main walls are concerned. As the pitch varies from 45 to 70 deg. and the lift is approximately 900 ft. long, it is necessary to adopt an entirely different method of working from that heretofore practiced in the field.

If both benches of coal in this seam are to be mined separately the question naturally arises: Which, the upper or lower bench, should be taken out first, and to what extent can the workings of one bench be kept in advance of those of the other bench? When solving

Third part of article entitled "Systems of Coal Mining in Western Washington," presented at the winter meeting of the American Institute of Mining & Metallurgical Engineers, held Feb. 16-19, in New York City. This paper is a thesis presented at the College of Mines, University of Washington, in 1924. Two previous installments appeared in *Coal Age*, one in the issue of Feb. 26 entitled "Room-and-Pillar Work in Steeply Pitching Beds of Pierce County, Washington," and one in the issue of March 19 entitled "Longwall at Carbonado."

The headpiece shows the incline from the town of Carbonado down to the tracks in the canyon. No coal is hauled on this track.

a problem of this nature, several factors must be considered, such as the pitch and thickness of the seam, the thickness of intervening strata, the hardness and tendency of the parting to swell or to slide, the general caving habits of the main walls, the peculiar features, if any, of the coal to be worked, the presence of faults and their extent and a most important factor, the length of the lift.

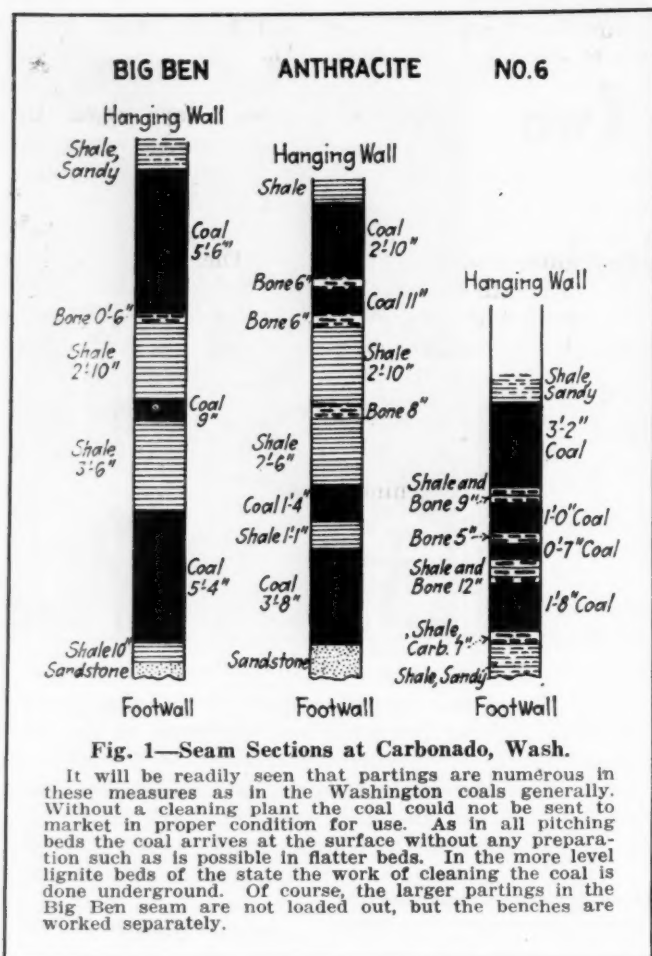
Anthracite men will be interested in the fact that in this double seam the bottom bench is drawn ahead of the top bench, this being because the thick separating rock is not strong and cannot be retained. Loose coal is kept in the bottom bench while the upper bench is being exhausted. Thus the heavy rock parting is supported while the pillars in the upper part of the bed are being drawn.

In this particular instance, the main roof and bottom are fairly good. The roof stands well and the bottom, under normal conditions, does not swell or slide to any great extent. There is little difference in the behavior of the coal benches, although the bottom one does not work quite as freely as the top. As in any seam, the top

bench requires less timber as it has the better roof and the bottom bench has the better footwall. There is, therefore, little difference in the individual characteristics of the coal benches from which to determine which of the two should be worked first. However, small faults cut the seam at various points, horses appear, and the intervening shale parting varies considerably. This materially affects any method, and its importance is increased by the scarcity of experienced pitch timbermen capable of repairing the chutes on this long lift.

The problem therefore resolved itself into how the intervening bench of impurities would act, whether the chutes could economically be kept open long enough to recover the coal with safety, and how the main roof would act and affect the workings in the lower seam. The experience of the management over a period of two years has proved that with an ample supply of timber such a seam can be profitably mined under normal market conditions.

As a chute-and-pillar method played an important part in the various methods of working, this method



is described. The usual way in which the workings are developed up the pitch and the general practices relating to the work have been described already,* but there are differences in the method of driving chutes, conducting the air current, and placing the manways. These need explanation. The method of drawing pillars is exactly the same, and the manner of driving chutes is not different from what is the usual practice at the Carbonado and Wilkinson mines.

As shown in Fig. 2, the chutes are driven up the pitch $3\frac{1}{2}$ ft. high and 4 ft. wide with no permanent brattice for ventilation. As a rule, the chute is driven on a bottom or top bench of the seam, depending on the nature of the walls, which may both be of coal or bone. However, only one wall is usually of coal and preferably the hanging wall, for the loose material must run over the bottom.

The method of timbering the chute will necessarily vary with the ground, but in the Big Ben seam posts with a cap piece are set every 5 ft. on the pitch in the chute which is on the bottom bench. These last only for the time required to drive the chute forward a few blocks. Their principal use is to carry the canvas brattice used in ventilating the chute while driving between the crosscuts. They also enable the miner to travel to and from the working face for a distance of one block. A step is hitched in the ribs every 5 ft., as shown, and a step made at the posts as shown. These are destroyed later by the loose material running down the chute.

In Fig. 2, the arrows indicate the direction of the ventilating current when the gangway is used as an intake.

*See *Coal Age*, Feb. 26, pp. 325-328.

The mines in the Carbonado district have been opened principally as water levels, for which reason chutes to be used as timber and air passages are driven to the surface at specified intervals. Whether these are used as an intake and the gangway forms the return, or just the reverse, depends on whether or not the mine is gaseous. If electric haulage is used on the gangways, the latter must be the intake airway. No attempt is made to keep the first crosscut or counter gangway open as it is not necessary for an airway other than at the time the area is being worked.

If the gangways are used as intakes, a blower fan and doors are necessary at the main opening (which is not the case at any mine in the Carbonado district), or small exhaust fans must be placed on the air chutes of the various seams eliminating the doors on the main haulage road. This is the general practice here if the gangways are the intakes. The most common practice in the Carbonado district is to use the gangways as the return airways and to place one large exhaust fan near the mouth of the main opening, using doors in this passage and utilize the air chutes on the different seams as intakes if several seams are worked from one main crosscut tunnel or opening.

Narrow chutes can be rapidly and more cheaply driven under the Big Ben method, even if less coal is loosened, provided the chute will stay open and the gas is not troublesome. If the chute will not stay open, maintenance becomes the important question, and probably a different method of timbering and chute driving would be used. It is impossible to use the chutes for traveling ways, for which reason about every fourth chute is made into a manway and a permanent ladderway placed in it, over which no coal is run so long as it is to be so used. A timber box is placed in the chute, outby, adjacent to the manway chute. Batteries are placed every two blocks to enable persons to cross the chutes safely at these points for any purpose, such as distributing timber.

SPEED IS BIG ADVANTAGE

Pillar coal is the cheapest and is usually the source of profit, and the advantage of the system is the speed with which the chutes can be driven. If the chutes stay open, there is a large saving in the timber and timber distribution on the pitch. Because of the nature of the seams, there are cases where a larger chute cannot be kept open and for long lifts it is a great advantage to maintain only a small chute.

The system has some distinct disadvantages. The work must be well balanced between chutes and pillars as hardly any coal is obtained from the narrow chutes. Then again if the seam is at all gaseous the faces cannot be kept clear because of the canvas brattice and other ventilation difficulties on the heavy pitch. Moreover, the blocking of the chutes by timber and large pieces of rock, or niggerheads, gives much trouble; such chutes must be freed, and chute starting becomes a hazardous occupation.

I do not recall an instance where a chute starter was caught in the wider chutes where manways are kept separate by a brattice in the chute, but in the narrow chutes workers have been suffocated while removing a block. The wide chute offers one remedy for the occurrence of accidents from this cause. It is obvious that with a manway in the chute it is easy and safer to take off a board or jar the chute to start the coal, whereas with a narrow chute it is necessary to climb

up it, place a charge of powder, and blast away the obstruction—an extremely dangerous practice if the mine is dusty.

The following safe and practical precautions should be taken when starting chutes; in this district, no starter has lost his life when these precautions were taken. As a rule, a chute blocks just below a crosscut, which means that it must be faced for at least about a block. A starter should never go alone to start such a chute; he should have a companion, who remains at the open crosscut below. Before the starter goes up the chute, a grizzly should be constructed over the chute at the lower crosscut, by placing timbers across with openings large enough for the loose fine coal to go through. If the coal rushes or breaks away, as it sometimes does and catches the starter while in the chute, he goes down ahead or with it and is caught at the grizzly. The fine coal passes through the grizzly, and the starter can be easily and safely rescued by his partner.

The foregoing method of carrying narrow chutes is practiced in lifts of over 1,200 ft. For many years, the workings have been confined to water levels. The timber is usually taken into the mine through combination air chutes and timber chutes driven to the surface. As in other occupations in coal mining, it has been found that better results are obtained when timber packing is done by contract. The cost of handling timber is an important factor, and unless it is carefully supervised the costs are soon on the red side of the ledger.

In the Carbonado district, a passage is not defined as a counter gangway unless made large enough for the tramming of timber and material and for use as a main

ventilating passage. These openings are usually made about four crosscuts apart, that is on about 200 to 240 ft. centers as measured on the pitch.

In the Big Ben mine at Carbonado, the timber packers are not on contract but are paid a day's wage. Under these conditions, on a pitch of about 60 deg., and where the timber is brought in at the top, or thirteenth, crosscut, which is called the thirteenth counter, five men can pass 80 props per hour from the thirteenth to the eighth crosscut or counter. These props average 6 ft. in length but their length varies from 5 to 9 ft. During an 8-hr. day, five men will pass 320 props, 160 from the thirteenth to the eighth counter, and 160 from the thirteenth to the fourth counter. It takes nine men $1\frac{1}{2}$ hr. to pass 40 props through the crosscuts and land them one-half block above or below the crosscut along which they are being passed. In 1 hr., using a timber truck on a counter, nine men can move 40 props along the counter for four blocks and then down the pitch one and one-half blocks.

For working the Big Ben seam various methods have been tried, the first of which was to open up the bottom bench as has been described. At the first, fourth, and eighth counters, rock chutes were driven to the top bench, as indicated in Fig. 3, which shows actual pillar measurements in this section plotted on the plane of the seam.

SUFFER LOSS OF LOWER SEAM

After the rock chutes were driven to the top bench, an attempt was made to remove the top bench ahead of the bottom bench, using a longwall method on the top bench. The face advanced up the pitch, and failed for the reasons given under the discussion of longwall methods, but the worst result was the loss of the lower seam. The causes of this were due to the large area worked ahead on the top bench.

The coal running down the chutes in the lower bench wore the chute to a width of 15 ft., or more; and because of the heavy pitch, the coal ran against the roof and ultimately wore through to the top seam. The whole area then became wild and uncontrollable, poor pillars resulted and a squeeze started, which overran these workings and extended to the gangway, resulting in a loss of much coal and causing much expensive maintenance. The widening of the chutes in the lower bench might largely have been avoided had a strong force of experienced timbermen been available.

It will be noticed (see Fig. 3) that the top bench was worked in advance of the lower bench for the greater part of the area of the workings, thus leaving large sections of the main roof free to act as it would above the parting between the two benches. Herein lies the worst danger of this method of working the top bench first, because the main roof does not break immediately, and there is no way of telling when it will cave. When it does, it breaks through the bench above the workings in the bottom seam causing them to cave. This happened on two occasions, and it was fortunate that no one was in the workings at the time. The method was unsafe and so was abandoned.

To further test the method of working the top bench ahead of the lower bench, a system of angle chutes and crosscuts was tried on the upper bench. The bottom seam was opened as before and at each block rock chutes were driven through the parting to the top bench or seam.

It was found that whenever a considerable portion

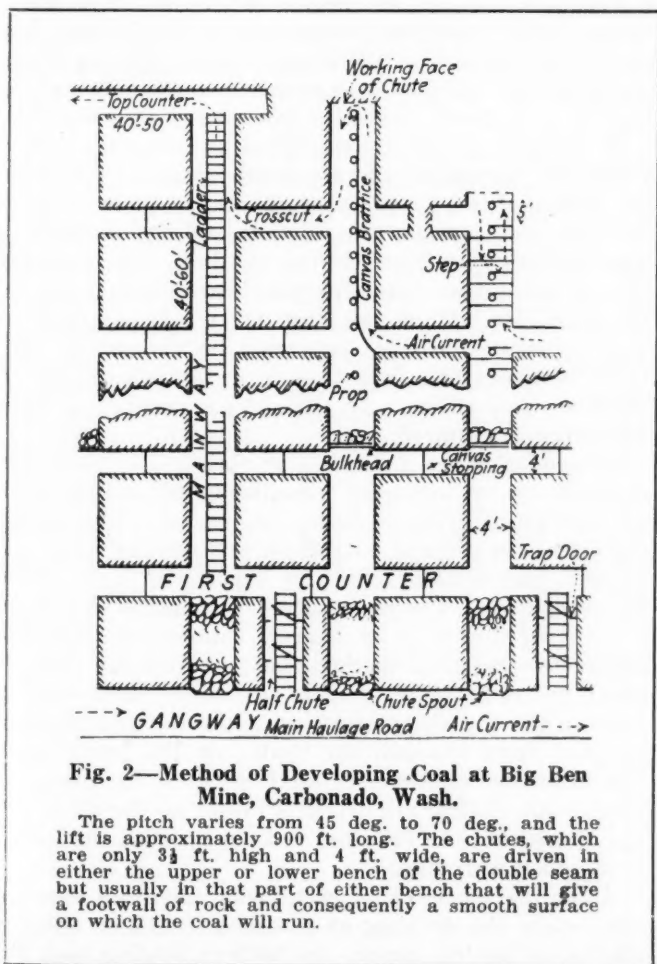


Fig. 2—Method of Developing Coal at Big Ben Mine, Carbonado, Wash.

The pitch varies from 45 deg. to 70 deg., and the lift is approximately 900 ft. long. The chutes, which are only $3\frac{1}{2}$ ft. high and 4 ft. wide, are driven in either the upper or lower bench of the double seam but usually in that part of either bench that will give a footwall of rock and consequently a smooth surface on which the coal will run.

of a pillar on the top bench was extracted in advance of a similar operation on the lower bench, the foot wall of the top bench, that is, the parting, tended to bulge and crumble, after which it was liable to slide. In this condition it afforded poor material for roof protection while the lower bench was being extracted. For this reason, it was found advisable to keep workings in the lower bench about one block in advance of similar pillar workings on the top bench.

The chutes and crosscuts on the top bench were driven at an angle of about 45 deg. across the pitch and starting at the top of the chutes of the lower seam, the pillar workings in the top seam were worked in advance of similar workings on the lower bench for a distance of from one to four blocks. The same results were obtained and a cavé from the main roof broke through the parting between the seams with a result that nearly proved serious. Experience has demonstrated that this practice is unsafe as there is no way of telling the condition of the main roof once the top seam is removed.

It was found, over a period of one year, that when the top seam workings were worked ahead of the lower seam workings by the longwall and angle-chute methods described, the recovery was 44 per cent.

Because of the experience just described, it was decided to work the lower bench in advance of similar workings in the top bench by starting at the top crosscut and working the pillars in the lower bench one block ahead of the pillars in the top bench and, further, the management determined to open up the top-seam chutes

only as required and drive these chutes on an angle across the pitch. Accordingly the chutes were opened on the lower bench and rock chutes driven to the top seam as required, starting at the top of the pitch workings. The pillars on both benches are recovered by the angle-and-tail method, or regular pitching-seam practice, which has been already described.

The mining method is shown in Fig. 4. A rock chute 1 is driven from the next to the top crosscut of the bottom-bench workings between chutes *c* and *d*, and slightly to one side of chute *c*, so as not to weaken the chute and to facilitate traveling to and from the top-bench workings. These rock chutes serve for ventilation and as passages through which the coal from the top-bench workings can reach the lower-bench chutes through which the coal is delivered to the gangway.

ADVANCING THE WORKINGS

Angle crosscut 2*L*, on the top bench, is then driven with about 45 deg. pitch toward 2*R*, previously driven from rock chute 1 of chute *b*; this makes a connection for ventilation. Angle chute 2*R* on the top bench is then driven. The half-block 3 on the bottom bench is then removed; this is called taking off the angle. A similar angle 4 is then removed on the bottom bench. The half-block 5 between chutes *a* and *b* is then removed; this portion of a pillar is called the "tail." Block 6 on the top bench is then removed through chute 2*R* from rock chute 1 in chute *a* of the bottom bench. As soon as the tail 5 between chutes *b* and *c* is removed, the V-shaped piece of coal on the top bench vertically above this tail, and between angle chute 2*R* and angle crosscut 2*L* of the top bench will be removed. As soon as the tail 8 of chute *a* on the bottom bench is removed, the coal of the top bench vertically above angle 4 will be removed from angle chute 2*R* and rock chute *x* in chute *a* of the lower bench. The workings are advanced in by the same manner, the pillar workings on each bench retreating toward the gangway.

By using the angle system, it was expected that slides would be averted in the top-bench chutes. Although the bottom heaved somewhat in the top-seam chutes, this was not serious in a distance of one block; but when driving the angle chutes, the high ribs sloughed off and the chutes ribs, although lagged, would run on the high side. True, the high rib would slough in a level crosscut but this coal could be allowed to stay there, whereas this is not so in an angle crosscut or chute on this pitch. An excessive quantity of extra timbering is required.

Consequently the method of driving angle chutes and crosscuts on the top bench was abandoned, and the present method of driving the top-seam chutes straight up the pitch was adopted. After several months' trial, the method has demonstrated its superiority over those formerly used. The most successful method developed is to open the seam by narrow chutes and work the pillars by the usual method, but to work the bottom-bench pillars first, one block in advance of similar workings on the top seam, starting at the top and running the coal down through the chutes on the lower seam. The top-seam chutes are offset about 6 ft. from the lower-seam chutes, are driven straight up the pitch and are opened only as required to keep up with the lower-seam pillar workings.

After the top block in each bench has been removed and before the drawing of a second length of pillar is started on the top bench, the battery holding back the

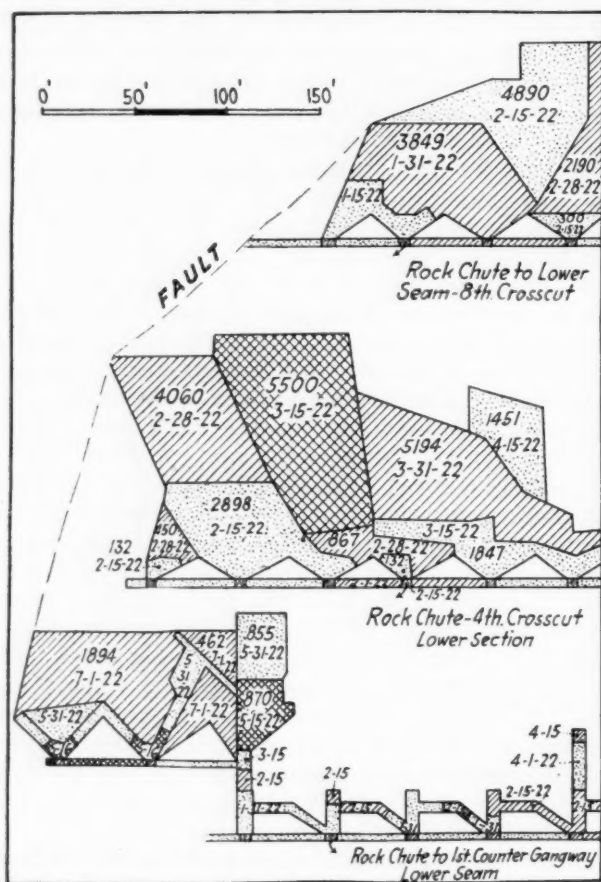


Fig. 3—Longwall Workings in Top Bench, Big Ben Seam, Carbonado Mine

This map shows progress dates in the removal of the coal. The top bench was worked in advance of the lower bench for the greater part of the area of the workings. When the upper bench caved it did so suddenly, breaking the rock between the benches and caving the bottom-seam workings.

caved material in the lower-bench workings is blasted out and the caved material is run into the lower-bench area excavated under the area of the top bench to be worked. This caved material is caught by a battery in the lower-bench workings below the area being worked here which area is one block in advance of the pillar workings in the top bench. This gives a better footwall support for the top-bench workings and it has been found indispensable that this support be given whenever one block or more has been removed and a cave has occurred in the lower-level workings. However, the workings generally stand open until one or two blocks are removed on the bottom bench. Caving is then prevented with difficulty and the pillar workings must proceed rapidly to avoid losing a pillar before all the coal is removed, and it is only by filling with the caved material that the intervening rock bench can be kept in place long enough to remove the top bench of coal.

FILLING LOWER BENCH WORKINGS

The method of filling the lower bench workings with caved material and drawing the pillars is shown in Fig. 6. In (a), the development work for the chutes and crosscuts is complete on the bottom bench, in which *a* is the face of the bottom-bench chute. In (b), the top, or seventh, block of the bottom bench has been removed and a rock chute and some coal in the top bench has been excavated. The same procedure has taken place in the sixth block in section (c). In (d), the procedure shown in (b) is repeated in the fifth block. The battery at the cog line in the seventh crosscut is then blasted out and the caved material run down against the battery in the sixth crosscut filling the space in the lower bench workings which lie below the coal in the top bench of the sixth block, which is then removed. This procedure is repeated until the entire section of pillars on both benches is removed, as shown in (h).

Over a period of nine months, it has been found that by this method in which the bottom bench is worked in advance of the top bench the recovery has been 70



Fig. 5—Carbon River Canyon Along Which Railroad Threads Its Winding Way

A glimpse of the steepness of the walls that close in on either side of this bewilderingly beautiful canyon will convince anyone that the Carbonado village must be built on the hills above and not hung on the uncertain slopes.

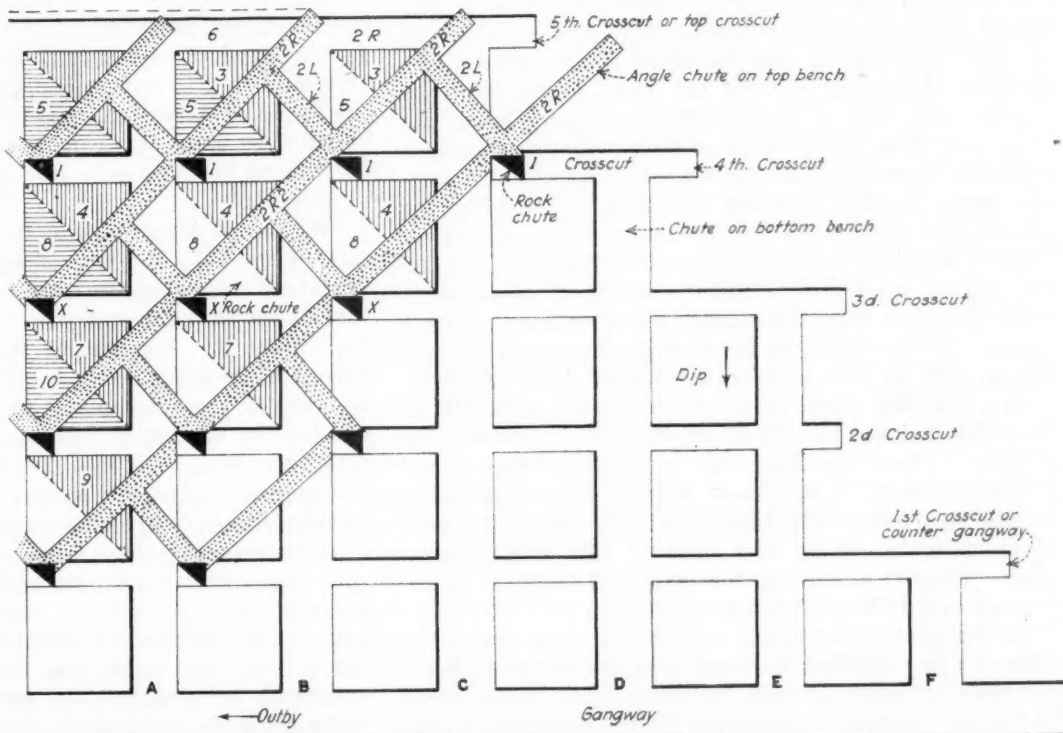
per cent. This will be increased, for most of the loss to date has been due to the losses in the angle chutes where the ribs ran away. The greater portion of the coal still in is represented by the present live workings and is being recovered.

It is apparent that the regular rock-chute mining

FIG. 4

Drawing Pillars

Here the lower bench was opened in advance of the upper by starting at the top crosscut and working the lower-bench pillars one block ahead of the top-bench pillars. The top-seam chutes were opened only as required and driven on an angle across the pitch. By this system it was hoped that the slides in the top-bench chutes might be averted but the ribs on the high sides of the angle chutes sloughed and the chute ribs, though lagged, would run on the upper side.



method is not strictly followed at the Big Ben mine, though, as in the regular method, all gangways, airways, and counters are developed first in the lower seam.

The question might arise why the top seam could not be worked out entirely from rock chutes on the gangway on the lower seam and then allowed to cave, and the lower bed then worked in the regular manner by narrow chutes, the pillars thereafter being drawn. Objections to this method are that the parting between the coal benches is such that it heaves and slides before the main roof caves. The presence of small faults and the heavy pitch destroy what is later to be the hanging wall of the bottom bench. The lift is so long that a squeeze comes on the lower workings and the chutes on the lower seam rapidly become uncontrollable; this means the making of manways and timberways on both seams, whereas the method last described requires that this be done but once, and that in the lower seam.

It is not an uncommon practice to work hard seams, such as anthracite, on a pitch and have the operations carried on simultaneously in both benches. However, the nature of this seam is entirely different, and for this reason the unusual practice of withdrawing pillars in the bottom bench in advance of similar workings in the top bench has been substituted in its place.

PROCEDURE WHEN PARTING IS FIRM

Let us suppose, however, that the parting between the two benches of coal should be found to be firm and thick and that the hanging wall of the top bench is inclined to heave or sag to such a degree as to allow the main roof to break over the waste workings in the top seam or bench, and at the same time that the footwall of the lower bench is firm. In that event if the lift in the upper seam is made by the longwall method described in the Miller mine (see "Longwall at Carbonado" in the issue of March 19), the main roof will break but owing to the filling of the top bench workings with waste and no serious consequences will result. The bottom bench can then be worked and caves obtained as desired. However, if this procedure is not followed the top bench is usually lost for the lower bench workings remain open over a considerable area, and when the main roof does let go such a tremendous pressure is instantly thrown on the adjacent workings that a serious bump results, crushing the pillars, breaking the timber, and at times caving in the section of the mine. This is especially true in a region of faulting. If the coal makes much gas, a large quantity of methane is often liberated from the crushed pillars when the crush comes. If the caving of the roof can be regulated, the bottom will not give any serious trouble from bumps.

In a pitching seam, as in any other, when the lift is over 450 ft. long, trouble is experienced in one way or another. From the start, due to the shortage of experienced labor, it has been difficult to maintain the chutes and, even with plenty of such labor, the cost of chute maintenance in a seam of this kind is very high. The lift is entirely too long, and the high maintenance cost is largely due to this cause.

In the present operation of the Big Ben seam, the gangway has reached its limit and the workings have not been extensive enough to demonstrate finally what is the best method to follow in future workings of this

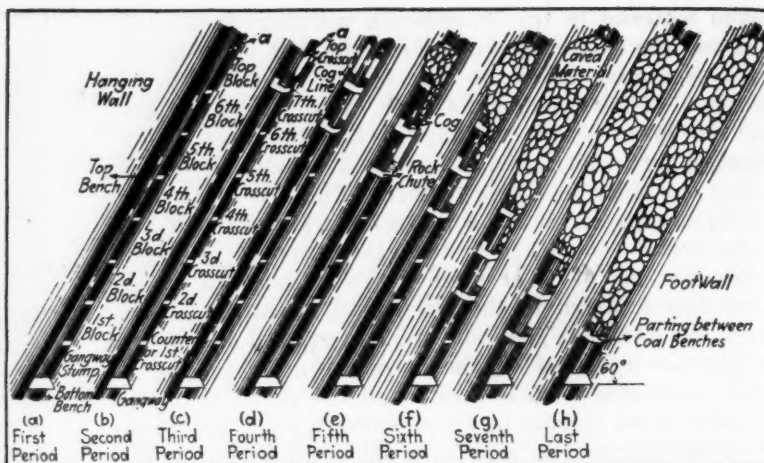


Fig. 6—Progressive Stages in Removing Pillars

The bottom bench is mined first and kept two blocks ahead of operations in the upper bench. As soon as the second bench is mined out in the second block of the two the coal from an upper block is allowed to fill up the space excavated in the first block of the two so as to support the coal on the upper seam above it. The pillars in the upper seam above the first block are then removed.

seam. If the present lift were cut in two, the mining system now in use would make in any new development a more profitable mine. Further, the output would be more flexible. Less territory would have to be kept open for the same output or the same territory when opened could be made to yield a larger output and what will yield 200 tons per 8-hr. shift with a struggle could be made to yield 300 tons in the same time at a lower cost per ton.

Dust Explosion Chases Shock Wave

In his "Review of Coal Dust Investigations" presented at the Annual Meeting of the American Institute of Mining and Metallurgical Engineers, George S. Rice, chief mining engineer, U. S. Bureau of Mines, says: "The pioneering air waves, or shock waves, that stir up the coal dust ahead of the flame of a coal-dust explosion, travel at the rate of a sound wave in a passage with rough walls and bends at 1,100 to 1,200 ft. per sec. The flame starts slowly from the ignition point, sometimes less than 100 ft. per sec., but rapidly accelerates except in a dust with low order of explosibility. In a fast explosion, with fine coal dust, the flame of explosive combustion travels at velocities of 2,000 to 4,000 ft. or more per second. The rate is accelerated for a specific dust mixture by the presence of firedamp.

"We do not know what occurs when a fast explosion catches up with the first shock waves started by the initiatory explosion, as this has not occurred within the length of main entry in the Experimental Mine; viz., 1,300 ft. We assume it will check the velocity momentarily until the shock waves have again advanced at 1,100 ft. per sec., to stir up the dust ahead without which prior mixing of coal dust in the air, an explosion must die away. It has frequently been observed in widespread explosion disasters that the velocity of the moving zone of explosive combustion, as indicated by relative violence, varies from point to point. The pressure manometer curves show that there is also a compression of air, which in some records has attained several atmospheres, immediately in front of the flame; but we do not know that the time—less than one-hundredth of a second—is sufficient to permit raising and mixing the coal dust in advance of the flame."

Viewpoints of Our Readers

Suggests Way In Which Factory Might Save That Half Stick of Powder

In the issue of March 5, appears an article entitled "Rocky Mountain Men Develop New Ideas in Coal Mining." In it is a reference to a paper read by H. Petersen, of the Hercules Powder Co., of which the second paragraph is as follows:

"Seventy-five per cent of all shots in mines are, in Mr. Petersen's opinion, overloaded. Some use three sticks of powder where two and one-half would be sufficient on the basis that the half stick is likely to be wasted, but the operator could better afford to lose the half stick than to charge it in the hole with the resulting shattering of the coal."

Mr. Petersen is correct in his opinion that holes are sometimes overcharged. Many a miner uses that extra half stick because he knows that if he cuts a full stick in two, the other half will probably be wasted, for we all know that dynamite and permissible powder soon deteriorate when exposed to the air. To put the broken half back into the cartridge box is like putting a rotten apple into a barrel of good apples;

it soon affects the others, so the miner regards that half stick as a total loss, which indeed it is.

I would like to offer a suggestion to Mr. Petersen as to the manner in which this obstacle might be overcome. Why not, when making the cartridges, make them in half sticks, but rewrap them again and make them the usual length, noting this fact by drawing a heavy black line at the middle of the cartridge. The miner could use this line as a guide when cutting off a part of the stick for use in the hole.

In my opinion the miner should be spared as much expense as possible and should not be compelled to waste powder. No doubt this new system of preparing cartridges would make it necessary to change the machines at the factory, causing added expense, but the miner would be inconvenienced and in the end the change would give so much satisfaction that the powder company would not fail of its reward.

DAVIS MACNICOL.

Windber, Pa.

Had Compressor to Blow Dust From Motors in 1911

The photograph of a motor-driven air compressor and the short article describing it, which appeared on page 337 of your Feb. 26, 1925 issue, much interested me. This is not a late development in the power department of coal mining. I installed almost identical outfits to this, in the different substations of the Consolidation Coal Co., some fourteen years ago.

If you will refer to Fig. 3, page 435 of your issue of Sept. 5, 1918, you will see equipment of this kind clearly shown on the right-hand side of the illustration, which exhibits also the air piping and rubber hose by which the synchronous converters in the substation could be blown out. The equipment consisted of a 3x4-in. belt-driven air compressor operated by a 2-hp., 220-volt, 1,800-r.p.m., 3-phase alternating-current motor and included a pop safety valve together with an 18x78-in. air tank.

In later equipments the size of the compressors was reduced to 3x3-in. with capacity of 2½ to 6 cu.ft. per minute at a speed of 300 to 500 r.p.m. The size of the air tank was also reduced to 16x60 in., good for pressures up to 100 lb. At that time, these complete equipments consisting of compressors, motor, reservoir, safety valve, pressure gage, etc. cost about \$125.

R. P. HINES.

Fairmont & Cleveland Coal Co.,
Fairmont, W. Va.

Can You Beat This Record?

In your issue of Nov. 20, the total output from Zeigler No. 1 Mine, during its life, is given as 12,632,615 tons, and the question is asked if this record can be equaled by that of any other mine in the world. We, in Nova Scotia, are not at all impressed by the total production of this mine, although its daily output is in excess of that of any of the mines in this province.

Dominion No. 2 Mine, situated in

Glance Bay, is now operating entirely in submarine areas, the workings being under the Atlantic Ocean. The percentage of extraction is 42 per cent, the other 58 per cent being left in to support the roof. The shaft passes through a bed of coal known as the "Harbor" seam, 450 ft. above the lower or "Phalen" bed. All the coal is drawn through one shaft to the surface. In 1900, the shaft was started. The mine began to produce coal in 1902, and since then the following tonnages have been drawn through this one shaft:

	Long Tons
Harbor or upper seam.....	6,294,879
Phalen or lower seam.....	13,827,113

Total20,121,992

We presume the tonnages for Zeigler No. 1 are on the basis of 2,240 lb.

We have no doubt that this can be exceeded by the outputs of other mines and do not think for a moment that it is a world record.

ALEX L. HAY,

Assistant Mining Engineer.

Dominion Coal Co., Ltd.,

Glance Bay, N. S.

The Ziegler No. 1 tonnage was given in short tons.—EDITOR.

Flame Safety Lamp Safe If It Is Safely Used

I have read with interest Mr. Harrington's article in your issue of Oct. 30 on the dangers of using flame safety lamps. Having been connected for some years with coal mines, where some thousands of flame safety lamps of the Clanny type with double gauze and magnetic locks were in use daily and having used also the Wolf Lamp I cannot agree with him that the approved type of flame safety lamp is such a menace as he asserts, if it is given proper care and attention.

Every mining man will agree with Mr. Harrington that accumulations of gas should not be removed during the working shift. I cannot agree with him, however, when he says, that it adds to the danger if firebosses make their examinations of old workings during the working shift, providing that no attempt is made to remove gas. In making inspections of old workings, however, the fireboss should not be allowed to do so alone, owing to the increased danger from falls of roof. Mr. Harrington is to be commended for his article, from which much good should arise.

D. R. MORGAN.

Tulsa, Okla.

Barrackville Mine Explosion Kills 34 Men

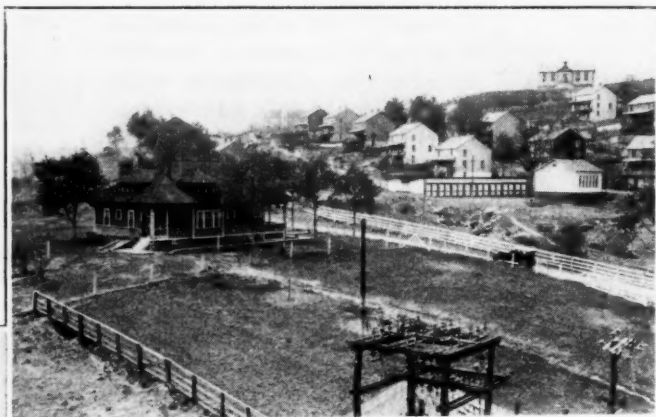
ON March 17 at 9:30 p. m. an explosion occurred in the No. 41 shaft mine of the Bethlehem Mines Corporation, at Barrackville (Marion County), not far from Fairmont, W. Va. None of the 34 men on the night shift who were inside the mine at the time of the explosion escaped. Not until March 23 were all the bodies recovered, the men at work being greatly scattered, it being the night shift and most of the men employed accordingly being machine runners.

The explosion was vented through the main hoisting shaft with a violence which caused the flames to shoot high in the air, tearing out the guides and buntons, jamming the cages and generally causing a mass of ruins in and about this shaft. The headframe was

virtually lifted from its moorings and displaced to the extent that one leg was moved a distance of about 12 in. from its original position; other members of this structure were twisted and torn. The concussion of the explosion on its release from the mouth of the shaft completely wrecked the main hoist room, caused one wall of an old brick compressor room at a distance of about 40 ft. from the edge of shaft to collapse and tore out the corrugated-iron siding from the tippie nearby. Windows of the houses and other buildings within a radius of about 1,000 ft. were shattered; the superintendent's residence and the company store were partially wrecked. Further details of the explosion appear on second page following.

BARRACKVILLE BEFORE THE EXPLOSION

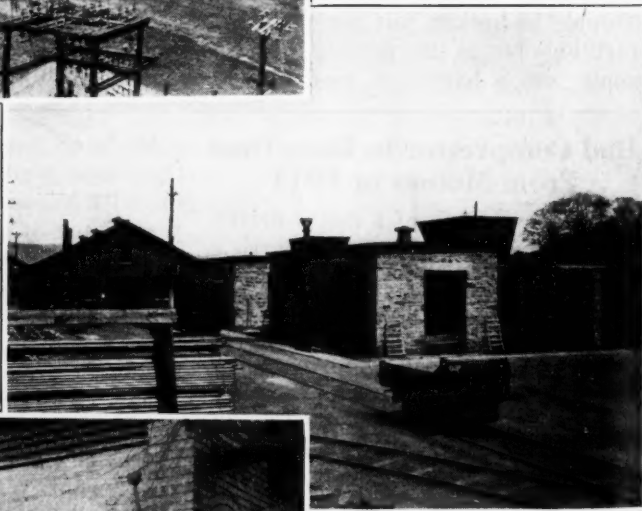
Right—Home of Division Superintendent with a Part of Barrackville Village in the Rear Background.



Below—Double Fan Installation, Uniflow Engine on One Fan and Electric Motor on Other. Latter in Use.



Above—Main Shaft, Engine House, Boiler House, Auxiliary Shaft and Main Hoist Before the Explosion.



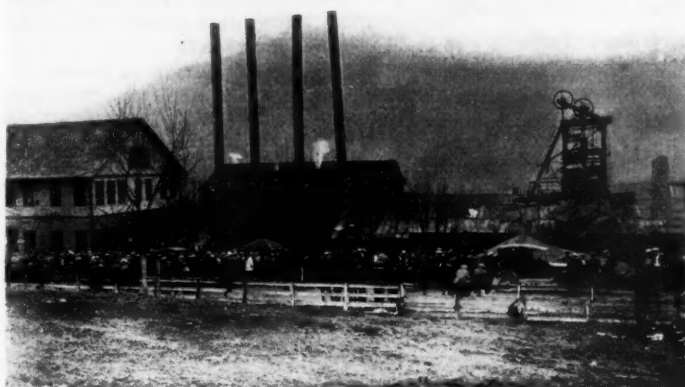
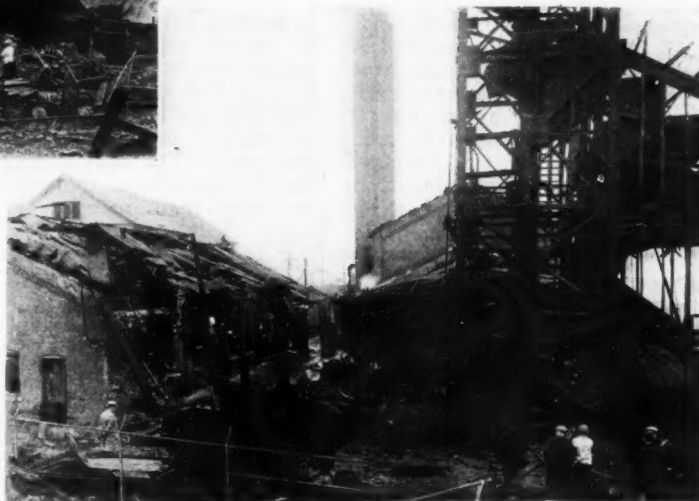
Left—"A Mine Pony". It Is Said that Thirty-Six of These Horses Were Found Dead in the Underground Stable.

BARRACKVILLE AFTER THE EXPLOSION



Left—Headframe and Hoist House of Main Shaft. The Demolished Building Behind the Back Stay of the Headframe Is the Hoist House, Which the Explosion Destroyed.

Right—Another View of Wreckage. The Force of the Explosion Jammed One of the Cages in the Shaft. To Left Is Compressor Room; in Rear, Hoist Room.



Left—As Seen from Public Road. The Main Shaft Was So Cluttered with Debris That It Was Not Possible to Use It for the Recovery of the Bodies.

Right — Compressor Room. The Explosion Was So Violent That This Outside Structure, Which Was Being Converted Into a Bathhouse, Was Almost Entirely Demolished.





News Of the Industry



Damage at Barrackville Mine Greatest In Main Shaft Where Air Entered

Little Violence Shown at Two Shafts—Trip on Main Bottom
Not Derailed—Many Timbers in Main Airway
Not Disturbed

Reports received March 23 regarding the Barrackville (W. Va.) explosion of March 17, pictured and described on pages 472 and 473, show that great violence centered about the main shaft, whereas the airshaft, about 400 ft. therefrom, and the man shaft, at a shorter distance, were little damaged. This led experienced mining men on the scene to remark that the action of the explosion was unusual.

The two hoisting shafts were used as downcasts and the airshaft as an exhaust. Some believed that the explosion split itself in the extensive workings of this mine and the several separate arms of the explosion buffeted each other and so saved the air and man shafts from much violence.

Aside from tearing loose a few guides and lodging the platform cage in the headframe, little damage was done to the man shaft. A wooden stairway in a compartment separated by a dividing concrete wall from the man hoistway of this shaft remained intact. This was fortunate because it enabled the rescuers to make a quick entrance into the mine. A hole was cut in the inoperative man-and-supply cage, through which the hoisting rope was dropped. To the end of this rope was attached a bucket for lowering supplies and materials. The rescuers used the stair to enter the mine.

Much Gas in Mine

Bethlehem No. 41 mine, or the Barrackville shaft, as it is commonly called, is very gaseous. In October, 1916, while this mine was in the possession of the Jamison interests, an explosion occurred, killing 10 men. In the rescue work following that explosion three additional men lost their lives, including E. M. Jones, who was then safety engineer of the U. S. Bureau of Mines.

Because the mine was so gaseous almost every precaution known to the industry was taken in the effort to make it safe. Closed lights were used exclusively. Empty cars were sprinkled on their way from the main bottom to the working places, and loaded trips were sprinkled before leaving the main partings. Water lines were laid in the main arteries of the mine and made available for use in the rooms. The program of the company provided for rock-dusting this mine at an early date.

Two large-capacity fans are installed

at this mine. They are the last word in modern ventilation equipment. One is driven electrically by purchased power, the other is a standby driven by a uniflow steam engine. Steam was available for use at all times as it also is utilized for driving the hoisting equipment. The explosion caused practically no damage to the fans, doing no more than opening the explosion doors. However, it did break the electric power lines and partly disrupted the steam lines, making it necessary to draw the fires in the boiler furnaces until necessary repairs had been made.

Within two and a half hours after the explosion an electric circuit to the fan house was closed, but, unfortunately, one of the doors in this unit was jammed, so the ventilation was not restored for nearly six hours, when repairs to the steam line were completed and the unit driven by this source of power was put into operation.

Not Many Roof Falls

The same intense violence marking the destruction in the main shaft and of nearby surface structures did not manifest itself in the mine. Although stoppings and overcasts were destroyed, the explosion did not cause numerous large falls of roof. Many timbers were left standing and at the junction of turnouts large crosspieces in many cases remained in place.

Despite the fact that the waves of the explosion apparently displayed the greatest pressure in the main shaft, a trip of loaded cars on the main bottom, with the exception of two mine cars within the trip, was not even so much as derailed. Only a short section of a brick arch which protected the main bottom was damaged at a point near the shaft landing. In fact, so free was the mine of obstructions caused by roof falls, that in the first eight hours of exploration the rescuers were able to reach butts 6 and 7 off the main north face entry, a distance of about 5,000 ft. from the man shaft.

A fire was discovered burning a pillar 170 ft. long between Nos. 5 and 6 left butts where these roads turn off the main north entry. The position of this fire was particularly dangerous by reason of the fact that it lay within a short distance of the nose of a goaf section, from which, it was feared, breaths of gas might be emitted.

Miner to Get Collins

W. H. Hunt, of Owensboro, Ky., former miner and also State Mine Inspector, under Governor Morrow in Kentucky, has accepted a \$3,000 contract to tunnel or sink a shaft and bring out the body of Floyd Collins, who was caught and died in a rock fissure in Sand Cave, near Cave City, in the latter part of January. Hunt received the contract from Homer Collins, brother of the dead man, who has been on the vaudeville stage in an effort to raise money with which to make the recovery.

The fire zone was sealed off without accident, at first temporarily, and later with three tile dams. In each of two of the latter walls two 4-in. pipes were placed, one serving the purpose of a blowoff valve while the other was utilized for flooding the fire zone with water. To accomplish this flooding a 4-in. fabric fire hose was dropped down and supported in the stair compartment of the man shaft, and thence laid to the fire.

Seventy-five trained apparatus- and rescuemen were available for almost immediate use and many more trained men later volunteered their services. The first group included rescue teams from each of the six divisions of the Bethlehem Mines Corporation, U. S. Bureau of Mines men and men from the West Virginia Department of Mines, under the leadership of Chief Robert Lambie. Governor Gore of West Virginia remained on the scene for several days.

As in the Benwood explosion, the Burroughs gas mask was used almost exclusively in the rescue work, the self-contained breathing apparatus being kept in reserve for emergencies and for the exploration of dead-end workings.

The cause and origin of the explosion are not known to the company or any of the mining men engaged in the rescue work. Some have attributed it to a charge of nitroglycerin, which they conceive was planted in the mine by malicious persons. Four men have been arrested. Since last autumn the Barrackville mine has been operating open-shop under armed guards. The rumor originated from the fact that three men on the night shift, who obtained employment on the day of the explosion, left the mine shortly before the catastrophe occurred. An inquest will be held this week.

Trade Commission Policy Modified in Interest of Safeguarding the Public

The Federal Trade Commission on March 17 announced changes in its rule of procedure and policies adopted by a majority consisting of Chairman Van Fleet and Commissioners Hunt and Humphrey. Commissioners Nugent and Thompson dissented. The commission for the guidance of its force issued the following:

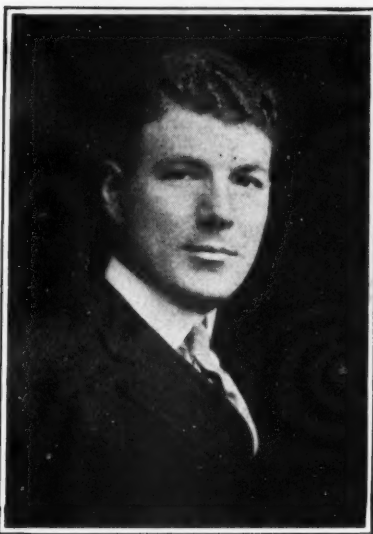
"Hereafter it shall be the policy of the commission not to entertain proceedings of alleged unfair practices where the alleged violation of law is a purely private controversy redressable in the courts, except where said practices substantially tend to suppress competition as affecting the public. In all such cases there must be three parties involved, the respondent, the competitor injured and the public. In cases where the alleged injury is one to a competitor only and is redressable in the courts by an action by the aggrieved competitor and the interests of the public is not substantially involved, the proceeding will not be entertained. . . .

"The end and object of all proceedings of the Federal Trade Commission is to end all unfair methods of competition or other violations of the law of which it is given jurisdiction. The law provides for the issuance of a complaint and a trial as procedure for the accomplishment of this end. But it is also provided that this procedure shall be had only when it shall be deemed to be in the public interest, plainly giving the commission a judicial discretion to be exercised in the particular case. . . .

"The rule shall be that all cases shall be settled by stipulation except when the public interest demands otherwise . . . and that the chief examiner, in accordance therewith or the Board of Review shall bring forward to the commission for such settlement all cases which in their opinion shall fall within this rule with their written recommendation." The commission also adopted a rule providing that "in all cases, before the Board of Review, before it shall recommend to the commission that a complaint issue, it shall give to the proposed respondent a hearing before said board to show cause why a complaint should not issue. Said hearing shall be informal in its nature and not involve the taking of testimony. The proposed respondent shall be allowed to make or submit such statement of facts or law as it desires. . . . Three weeks' notice of the time and place of such hearing shall be served on the respondent by the secretary of the commission."

Indiana Has Another Blast

In the third explosion since March 5 in Shirkie Mine No. 1, northeast of Terre Haute, Ind., two shotfirers were killed the night of March 16. The mine was badly damaged by the last explosion. Two men were killed and two injured in the first two explosions, on March 5. Eight windy shots caused all three accidents, it is said. A third shotfirer in the last explosion was uninjured.



Cadwallader Evans, Jr.

Succeeds R. H. Buchanan on April 1 as general manager of the anthracite operations of the Hudson Coal Co., with offices at Scranton, Pa. Mr. Evans was born in Pittsburgh, Pa., in 1880; graduated from Lehigh University in 1901, was forge-shop foreman with the Oliver Iron & Steel Co., Pittsburgh; superintendent, Blaine Coal Co., Pittsburgh, 1901-4; made special investigations in reference to washing inferior Pennsylvania coals, 1905-6; general manager, Pittsburgh & Surinam Gold Dredging Co., Paramaribo, Dutch Guiana, 1907-9; superintendent, power plant, Oliver Building, Pittsburgh, 1909-12; general manager, Acadia Coal Co., Stellarton, N. S., 1912-15; general superintendent of mines, Hudson Coal Co., 1915-17; general manager, International Salt Co., 1917-20; president, Engineering Development Co., and consulting engineer, Rocket Brook Coal Co. He also is the inventor of a scraper loading device for use in thin seams. Mr. Buchanan is to assume the presidency of the newly formed South Penn Collieries Co., the offices of which are to be transferred from Philadelphia to the Bowman Building, Scranton, Pa.

Coal Company Pays For Suicide

Whether dependent heirs of a miner who commits suicide through despondency because of injuries suffered in the line of his employment can collect compensation on that ground was the unique question raised in a suit in the Crawford County (Kan.) District Court recently. A decision was prevented by a settlement of the suit. James Javella was injured by a fall in the wash house of Sheridan Coal Co. mine No. 9, where he was employed, April 11, 1921. The company under the terms of the compensation law paid him total disability to the amount of \$2,500 between the time of his injury and his suicide, Nov. 25, 1924. His widow, in behalf of herself and two minor children, then brought suit for additional compensation on the ground that Javella took his own life because he was despondent over his injury precluding his ever returning to work in the mines. A settlement was effected March 5 by the Sheridan company paying Mrs. Javella and her children \$500.

Buchanan Leaves Hudson To Head South Penn Co.; Evans Takes His Old Post

Special to Coal Age

R. H. Buchanan, vice-president and general manager of the Hudson Coal Co., was elected president of the new South Penn Collieries Co. at a meeting of the board of directors of that company in Philadelphia on Tuesday, March 17. He will leave the service of the Hudson Coal Co. about April 1, when he will assume his new duties.

Cadwallader Evans, Jr., has been appointed general manager of the Hudson Coal Co. to succeed Mr. Buchanan, according to a statement issued by A. M. Fine, vice-president of the company. Mr. Evans will assume his duties on April 1.

Mr. Buchanan joined the official personnel of the Hudson Coal Co. eight years ago. At that time the Hudson company was the fifth largest producer of anthracite. Under the guidance of Mr. Buchanan, as general manager, production was so increased during that period that the company is now the third largest producer.

The new South Penn company will open offices in the Bowman Building, Scranton, on April 1. Lee, Higginson & Co. and Cassatt & Co. will be their bankers. The company numbers several prominent industrial chieftains on its directorate, among whom are B. Dawson Coleman, director of the Baldwin Locomotive Works; Alfred A. Carey, president of the Vanadium Corporation of America; John Mason, chairman of the board of directors of the Bank of North America & Trust Co.; former Governor William C. Sproul and Francis V. duPont.

The South Penn company will operate the Von Storch, Legitts Creek, Catherine, Randolph and several small collieries in the Pottsville region, as well as several washeries. The Von Storch and Legitts Creek collieries are located at Scranton, the Catherine colliery at Shamokin, and the Randolph colliery in Pittston.

Eli Conner, consulting mining engineer of the Hudson Coal Co., has resigned his position with that organization. His successor has not yet been named.

Union Withdraws from Alberta Wage Parley

A conference between the officials of the United Mine Workers of District 18 and the Western Canada Coal Operators Association held at Calgary on March 17 to consider a new wage agreement was broken up before any conclusion was reached, owing to the withdrawal of the miners. J. Shanks, president of the operators association, expressed regret that during the six months interval before a new agreement would go into effect many good coal contracts would be lost owing to the uncertainty of the situation. He stated that the operators had no intention of repudiating the existing agreement or asking the miners to take a reduced wage in the meantime.

Illinois Mines Suffer \$300,000 Damage In Furious Cyclone

New Orient and Peabody No. 19 Plants Escape Comparatively
Lightly—Top Works of Peabody No. 18 Wiped
Out—Indiana Operations Unscathed

Steel, concrete and engineering talent acquitted themselves well in meeting the fury of a cyclone which swept through the coal fields of southern Illinois and southern Indiana, March 18. And good fortune rode with the mines. Although the snout of the storm bored its way through regions thickly studded with tipples, headframes and mine smokestacks, only three mines were hit—New Orient and Peabody Mines Nos. 18 and 19, all at West Frankfort, Ill., and all directly in the path of the twister—and two of the three are prac-

of about 15,000 people. Orient No. 1 mine, the C. W. & F. giant at the westerly edge of the town, creaked under the force of the outer and lesser currents of air but stood firm. Then the whole north side of the wooden town was mowed down into kindling wood. New Orient, completed last year by the Chicago, Wilmington & Franklin Coal Co., to become the greatest coal mine in the world, lay directly in the path. Its huge steel rescreening plant and tippie, with their expanse of zinc siding offering tremendous wind resist-

the cyclone had gone by them and struck the rescreener.

Men in the tall, zinc covered steel rescreener said they felt the structure sway strongly to one side on its steel stilts until the sheeting began to rip off, letting the wind through. In that instant the structure went back to plumb. They dived headlong into the bins under the screens. Next in the storm's line was the tippie. The men on picking tables there felt the structure execute much the same gymnastic feat in the instant before the siding was ripped away. They hung onto the wide steel pillars or jumped under the screens. In the hoist house nearby part of the tile roof was sucked off. The handful of men in this brick, steel and tile structure rushed for the basement, a door blowing down ahead of them as they ran for it.

The long conveyor running from the auxiliary shaft to the top of the main tippie twisted in two. A locomotive crane standing on the "high line" of empty railroad tracks—a grade which partly protected the washhouse—tipped over and crashed its long boom onto the washhouse roof. A wide section of the tile roofing disappeared, leaving all the clothes undisturbed on their hangers near the top of the building. The huge water tank standing on its 70-ft. steel supports was lifted and then dropped without hitting any building. Across the quadrangular yard of the mine the force of the wind descended on the long brick, steel and tile shops and supplies building. The shop, about 100 ft. long, was caved in with some damage to some of the drills, hammers and lathes within.

At one side of the shop building an outdoor storage yard for timber and other material was skipped by the wind but the nearby low building that housed explosives simply disappeared into thin air, leaving the boxes of powder neatly stacked. An automobile soaring through the air from nobody knows where alighted in the center of the mine yard, bearing four dead bodies. Empty coal cars on the "high line" were dumped about promiscuously, most of them separating from their trucks. One empty rolled down the lee



Something Truly Grievous Happened to New Orient Shop

The force of the tornado seemed to be downward when it passed over and through the tippie and other structures and hit the long brick shop. This building suffered more than any other on the whole property. Pictures made by George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co.

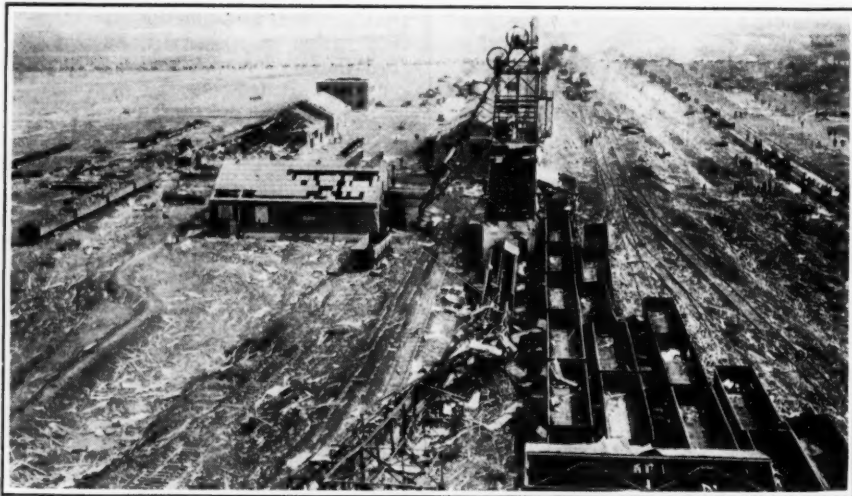
tically ready to operate. Peabody No. 19 was scheduled to run March 23 or 24 and New Orient on March 30. They were lashed and tattered and plastered with the debris of the countryside but their essential machinery and structures came through intact. Peabody No. 18, built twenty years ago, was swept clean of top works and cannot run for months. The total property loss at the three mines is approximately \$300,000 and is largely covered by tornado insurance.

The cyclone originated in southeastern Missouri, jumped the Mississippi and tore its bloody way through a row of coal-mining towns following a northeasterly direction. Murphysboro, a great coal community for a generation, was smashed. Only two of the mines in the famous group there were operating—Consolidated No. 10 and a mine owned by the Western United Gas & Electric Co.—but all the mines were far enough north to be out of the track. Then the village of De Soto was ruined horribly. The mines there also were too far north—by a scant half mile. Then Bush disappeared; but the Missouri Pacific mines were spared. And Hurst fell; but no mine works fell with it. On northeasterly proceeded the roaring storm, missing by rods or yards the mines scattered through Jackson and Williamson counties and the southern corner of Franklin County. There are those who marvel that the high gods did not direct it through Herrin, where so much bloody history has been written of late years.

It approached West Frankfort, a town

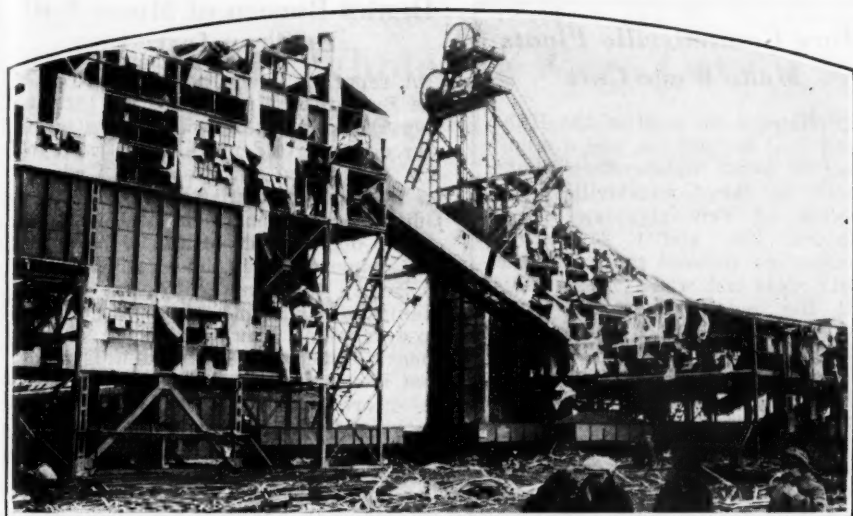
ance, stood ready to catch the whirlpool at its center.

J. V. Carroll, father of the C. W. & F. chief engineer, was in the scale house. He said he knew a storm was coming but did not realize it was a cyclone until he saw a wooden house three blocks away suddenly shoot into the air and explode 50 ft. from the ground. Then he and a train crew that had taken refuge in the scale house from the hail outside dived for the pit under the scales. The door was locked, but by the time they discovered that



At New Orient Mine After the Tornado Had Done Its Worst

Looking from the top of the main headframe toward the auxiliary hoist with its hoisthouse partly unroofed, and toward the mine yard buildings which were partly crushed in. In the middle background is the concrete stack standing perfectly plumb and sound. The water tank nearby was dumped to the ground.



New Orient Top Works Battered But Unbowed by Tornado

The passage of the southern Illinois storm of March 18 ripped the zinc siding into tatters on the rescreeener (left) and main tippie (right), but the steel structures withstood the awful battering and remained in alignment and in operating condition.

side of the railroad bank and brought up on top of a neat row of five Fords. Most of the remainder of the yardful of miners' and officials' automobiles were tossed about, but two or three did not even suffer a torn curtain.

The two-story brick and tile office building, standing at the east end of the orderly collection of mine structures, was last to catch the sweep of the wind. Windows began to break out and doors blew through their door holes while papers and books shot through into space. Office workers jumped into vaults or flattened on the floors. The building stood.

Emergency Engines Operate Hoist

Then the storm was gone, leaving the mine top works battered, stripped and unroofed but still in working condition. The electric substation outdoors was damaged and put partly out of commission and the power line serving it was broken, thus shutting off current to the mine, but the boilers in the end of the washhouse were untouched and provided steam for the pair of engines which can be used in emergencies to operate the man hoist. So the men were hoisted out.

A total of 749 men had been underground and of course were unhurt. A total of 124 had been at work in and around the top works. Out of this small army there were no deaths, but two suffered broken legs, one a broken arm and seven received cuts and abrasions. The property damage was estimated to be something less than \$100,000. The two headframes and the main tippie and the rescreeener plant were thought to be in perfect alignment and all the essential machinery and equipment in good shape.

Across a state highway east of New Orient and half a mile away stood a roundhouse and coal chute of the Chicago & Eastern Illinois R.R. This plant was smashed. Half a mile further in the path of the storm stood the top works of Peabody No. 19 mine. It is a comparatively modern set of steel structures erected about twelve years ago on an old mine. The stacks all went down and the roof of the boiler house was ripped off, but the wind went

by, leaving the tippie, hoisthouse, headframe and fan house almost undamaged.

H. M. Young, vice-president of the Peabody Coal Co., in charge of mines and mining, was underground and deep in the mine at the time. He noticed nothing but a shutting off of electric current and a temporary stoppage of the air. This his party regarded as of no consequence for a couple of minutes until someone came through ordering everybody out. A message about the approaching cyclone had been coming down by telephone when the storm struck and broke the wire, stopping the conversation in the middle. The whole crew of men came out. None of the top men was killed.

The property damage totaled about \$30,000. A double header line from two batteries of boilers was broken and had to be reconnected, but the four boilers of the low-pressure unit were available for service at once. Within 48 hours two new steel stacks had been erected and the others were on their way. The mine was to reopen full blast Monday the 23d.

Peabody No. 18 Hard Hit

Further along stood Peabody No. 18, an older mine with top works of steel but of much lighter construction. The whole set of structures was wiped off the map, leaving nothing but the squat, concrete fan house. The men below, near the bottom of the shaft, said they felt a sudden concussion as the cyclone passed over the top of the shaft. Then the current went off, a cage dropped and the air stopped. So the crew hastened out the escapeway. George C. McFadden, assistant to the vice-president in charge of operation, was in the mine at the time.

The loss at this time will exceed \$150,000 and the mine will be down for months. The company has not made definite plans for rebuilding it. Three men were killed here and seven or eight were hurt.

From this mine the storm tore eastward, demolishing the countryside but hitting no more mines, even at Princeton, Ind., in the outskirts of which is the new mine only recently built by R. J. Smith.

Hard-Coal Operators Approve New Sizing Standards

As forecast in the preceding issue of *Coal Age*, definite standards for the sizing and preparation of anthracite were approved by the Anthracite Operators' Conference at a meeting held at Philadelphia, Pa., last Thursday. The conference recommended that the industry put the new standards into effect April 1. With the exception that the screen over which pea passes will have a round-hole mesh of $\frac{1}{8}$ in., instead of $\frac{3}{16}$ in., the standards approved are the same as were published in *Coal Age* last week.

In a statement issued last Friday, the operators call attention to the fact that the meshes adopted are for test screens to be used at the breakers and not the breaker screens. The same declares that "while the new chestnut made in accordance with the above standards of sizing contains an increased percentage of large pea, as compared to the chestnut produced years ago, it has been demonstrated by practical test that its fuel value is equal to, if not greater than, the old standard. The remaining pea will be more uniform in size.

"It is also recommended that the maximum of undersize coal shall not be more than 15 per cent, with the proviso that in the case of chestnut only an additional 5 per cent shall be allowed for unavoidable degradation. Permissible percentages of bone or slate range from 2 to 7 $\frac{1}{2}$ per cent, depending upon the size of the coal."

S. D. Warriner Cites Difficulties

In announcing the action taken by the conference, Samuel D. Warriner, chairman of the meeting, said:

"Emergency measures adopted during the war and in periods of scarcity following the war have resulted in more or less diversity in sizing and in preparation as between different operators, and our objective at the present time is to overcome this variance.

"While it may seem to be a very simple matter to set up rigid standards and regulations for the sizing of coal, many difficulties have been encountered owing to the fact that coal in the different collieries does not fracture in exactly the same way or to the same extent. Different coals prepared with identical screens result in a different appearance in product. The aim is to arrive at uniform standards and to eliminate sub-standard products.

"Aside from this, the principal effect of the action taken will be to cut down the tonnage of pea coal and to that extent to eliminate as far as possible one of the sizes of anthracite for which demand has decreased owing to improvements in heating devices, and increase the supply of chestnut, which has been inadequate.

"It is the intention of the conference to advise retailers and the public of the recommendation of these standards, with the purpose of inviting the widest co-operation in their maintenance by all elements in the industry. It is believed that the users of anthracite will be better served by adoption of these new standards."

Rival Unions Seek Control In West Virginia

Two formidable rival divisions of the small army of mine workers in southern West Virginia are vying with each other for the support of those at work in the mines. The first tangible step of the newly organized Mine Workers Association of West Virginia to obtain a foothold was taken Sunday, March 15, at Scarbro, where a mass meeting of about 1,000 miners was held. This step was taken following closely on the heels of an announcement of the United Mine Workers that it was financing a drive to organize all the non-union coal fields in the state and had called a strike of all non-union mine workers in northern West Virginia for April 1.

The two organizations are formed on radically different lines. The United Mine Workers organization has announced through Van A. Bittner, in charge of northern West Virginia, that it will endeavor to bring about a strike in that section of non-union miners on April 1. If that is not successful, many operators express the belief that northern West Virginia will be lost to the union.

The United Mine Workers is endeavoring to obtain recognition of the union and adoption of the Jacksonville agreement. The more recently organized union does not favor the Jacksonville agreement but asks for a scale "which will permit the mines in southern West Virginia, now closed because of the Jacksonville scale, to reopen on a profitable basis."

The new organization, which is headed by Thomas Cairns, formerly president of district 17, will issue local charters and will begin to function just as soon as locals are organized. The new union announces that it is opposed to strikes, lockouts and mine wars.

Mine Workers Assessed

The United Mine Workers has assessed its members at the rate of \$1 a month for two months, according to union officials, for the purpose of carrying on organization work in West Virginia.

Operators generally do not believe that the organization drive will be successful, but trouble and clashes between union and non-union workers is expected in many sections of the state.

John L. Lewis, head of the United Mine Workers, in a telegram to Van A. Bittner has given approval to the call issued to non-union miners to strike on April 1.

Sealed bids will be received by F. S. Hammond, purchasing agent of the Pittsburgh, Shawmut & Northern R.R., John D. Dickson, receiver, at his office in St. Marys, Pa., on or before 12 o'clock noon March 31, for entering into contract serial No. 4, for furnishing approximately 70,000 tons of bituminous coal, for the use of this railroad, from April 1, 1925, to March 31, 1926, both inclusive. Copy of specifications may be seen at the office of the purchasing agent, or may be obtained upon payment of a fee of 50c.

More Connellsville Plants Make Wage Cuts

Following the lead of the Hillman Coal & Coke Co. and a number of other independent operators in the Connellsville coke region of Pennsylvania, W. J. Rainey, Inc., and a few other companies reduced wages to the 1917 scale last week. Practically all the independents have cut wages except the Buckeye Coal Co., Monessen Coal & Coke Co. (a subsidiary of the Pittsburgh Steel Co.), Reliance Coal & Coke Co., Century Coke Co. and Fayette Coke Co., and these probably will follow suit on or before April 1.

Indiana Starts Writing Some New Mining Law

Echoing the Sullivan mine disaster, the Indiana House of Representatives took steps to add safety precautions about the laborers in Indiana mines when it tacked amendments to the Sims senate bill regulating mine operation. The House accepted an amendment which provided that a telephone be placed at the bottom and the top of a mine shaft and at every parting or turning of the mine courses.

The provisions apply to mines employing more than ten men. An amendment requires the sprinkling of mines with rock dust, excepting where safety lamps are used. Gasoline engines are prohibited in all mines throughout the state, but otherwise the provisions of the bill do not apply to mines employing less than ten men. When the bill came from the Senate it applied to mines employing more than three men, but was amended in the House committee. The bill passed the House by a vote of 77 to 0.

In addition it provided that all concerns in Indiana which drill oil and gas wells be compelled by law to seal these abandoned drillings below and above each coal vein and to file with the recorder of the county where the drilling took place a map of the drilling, together with the plugging. This is intended to provide safety for mine operations later in districts where drillings have taken place. This would be provided by preventing the gas which may find its exodus through these drillings from escaping into the coal vein and thus being a hazard to future mining in these veins.

Both of these measures were advocated at a meeting which the House Committee on Mines and Mining held of representatives of miners and mine operators following the Sullivan disaster.

John Hessler, of Terre Haute, president of District 11, United Mine Workers, suggested the well-drilling legislation. This same provision was embodied in a bill before the Legislature of 1923, but, miners said, a powerful oil lobby succeeded in having the bill killed.

Denies Bureau of Mines Will Be Transferred

A report is current that transfer of the Bureau of Mines from the Interior Department to the Department of Commerce, by Presidential order, will follow the action of President Coolidge on March 19 of transferring the Patent Office to the Department of Commerce.

The organic act of the Department of Commerce gives the President legal authority to transfer to that department those bureaus whose major purpose is along the line of the department's function. This administration and its predecessor have been active in an effort looking to the better organization of the executive departments. As an indication of its faith in its policy, it is felt that the administration should carry on reorganization to the extent that it may under the authority already vested in it by Congress.

Commenting on the report concerning the transfer of the Bureau of Mines to Commerce Department, an administration representative declared that he knew of no foundation for the report. Pointing out the Patent Office was created before there was a Department of Commerce, he stated that the Patent Office, executive order for the transfer of which to the Commerce Department was issued this week, is distinctly a commercial enterprise and does not fall naturally under the Interior Department. He said he did not see that there existed any such reason or particular economy in transferring the Bureau of Mines.

B. & O. Seeks Third Interest In Monongahela R.R.

A dispatch from Charleston, W. Va., March 13, to the effect that the Baltimore & Ohio R.R. road desires to acquire one-third interest in the Monongahela R.R. was confirmed at the general offices of the Baltimore & Ohio in Baltimore.

It was stated that a bill is before the West Virginia Legislature seeking permission by the Baltimore & Ohio to participate in the development of the Monongahela R.R. instead of constructing an independent line of its own that might otherwise be necessary for the development of the coal deposits of northern West Virginia. If the Legislature assents, the movement of this traffic would be greatly facilitated via the Monongahela R.R. to the Baltimore & Ohio's lines through Connellsville to Cumberland, thus relieving the present route by way of Grafton and over the mountains.

New York Anthracite Prices Beginning March 23

Anthracite Prices
(Per Gross Ton, f.o.b. Mine)

	Broken	Egg	Stove	nut	Pea
D. L. & W. Coal Co.	\$8.00	\$8.25	\$8.50	\$8.25	\$5.25
Lehigh & Wilkes-Barre Coal Co.	8.00	8.25	8.75	8.25	5.00
Hudson Coal Co.	8.25	8.25	8.75	8.25	5.50
Phila. & Reading	9.15	9.15	9.40	9.40	6.00
Lehigh Coal & Nav. Co.	9.25	9.25	9.50	9.25	6.00
Lehigh Valley Coal Co.	8.50	8.30	8.75	8.50	5.25
M. A. Hanna Co.	8.80	9.15	9.85	9.60	5.75
Company prices for No. 1 buckwheat: \$2.50@ \$3.00; rice, \$2@ \$2.25; barley, \$1.50, and birdseye, \$1.60.					

Keen Rivalry Among Non-Union Mines Seen in Wholesale Wage Cuts

Cleveland Conference Failed Because Illinois and Indiana Operators, Having Suffered Less Than Ohio and Pennsylvania, Can Wait Longer—Delay in Rate Decision Likely to Cripple Union Output Further

By Paul Wooton

Washington Correspondent of Coal Age

The much-talked of meeting of March 17 has come and gone. Like so many of the meetings of the bituminous coal trade, it ended in indecision.

All operators at Cleveland were agreed that wages should be reduced but the varying conditions in different parts of the Central Competitive Field were revealed by the attitude of the several delegations. It emphasized the fact that Illinois and Indiana have been punished less severely than have Ohio and Pittsburgh by the competitive effect of the Jacksonville agreement. Hence Ohio and Pittsburgh were of the opinion that the miners had had enough and might listen to a proposal for a reduction. Indiana and Illinois felt that that moment had not arrived. Apparently the operators in those states think that the period of slack times and unemployment must drag itself out still further before the miners in districts 11 and 12 will be in a mood to consider a revision downward.

Coincidental with the news of the meeting come advices from many quarters that the competitive pressure of non-union coal is bearing down more heavily than ever. The sudden spurt of business following the turn of the year, which carried production over the 12,000,000-ton mark, has subsided. Prices, which had made a feeble attempt to go upward again, are on the downgrade with an output of less than 10,000,000 tons for the first week of March.

Reduction Is Widespread

On the heels of the sudden slump in demand has come a further wave of wage reductions. The December advance in the Connellsville wage scale made by the independent operators has been withdrawn. Almost overnight the \$5 per day scale of 1917 is substituted for the \$7.50 scale of 1920. From Colorado comes the word that the Colorado Fuel & Iron Co. has made a 20-per cent cut in the Walsenburg district. This is regarded as an event of much significance. Heretofore the company is understood to have followed the policy of basing its wage scale on the going rates in the Central Competitive Field. The whole state now is on a non-union or open-shop basis.

The growing strength of the non-union movement in the Southwest Interstate region had a bearing in bringing about the reduction. The reduction is said to have been made at the instance of the men working under the Rockefeller plan of employee rep-

resentation. If that is so, it is regarded as a rare development under that plan, for the report of the Sage Foundation, recently published, shows that the employees seldom discuss wages with the management.

Another Rockefeller interest, the Consolidation Coal Co., has induced the miners in its Somerset properties to take a 25 per cent reduction. Just at this time much interest is focused on the mines of the same interests in northern West Virginia. They are the only remaining union operations in the Fairmont district. Interesting developments there are expected momentarily.

The Pittsburgh Coal Co., though adhering to the scale, is closing sixteen of its mines so as to concentrate its remaining business in its lowest cost mines.

Reports of reductions continue to pour in. While the results of the Cleveland conference may not be influencing this tendency, it is becoming more certain that the competitive pressure of 1924 will continue to increase in 1925. Little by little all the non-union tonnage is shaking down to the 1917 scale or something lower. More and more of the country is going non-union. The position of the union fields is getting more difficult. More miners are shifting to non-union territory. In consequence the potential capacity of the non-union fields is increasing greatly and 1925 promises to see intense competition among the non-union operators themselves.

The non-union shipper has had an easy time of it is recent years; with his hands free he has been fighting the union producer, whose hands have been tied. The non-union producer probably will find the fight a more grueling one from this time forward. He now faces an antagonist whose hands also are free. The bout is catch-as-catch-can. There is practically no limit to the extent that the slashing of prices and wage rates may go.

In addition to their other difficulties the union operators now are face to face with the expiration of contracts on April 1. They cannot rely on early lake business, as the probable increase in the freight-rate differential will spur Southern operators to ship the maximum possible tonnage before the final decision in the case is handed down.

An order for 125 mine cars was received March 19 by the American Car & Foundry Co. from the Replier Coal Co. and a similar order from the Madeira-Hill Coal Mining Co.

Welsh Miners Run Colliery Rather Than Lose Jobs

Taking the advice of Prime Minister Baldwin, who said miners should get a colliery and try to run it themselves, employees at the Vauxhall Colliery, in North Wales, have arranged with the management to conduct the business.

The colliery owners lost £23,000 in the last four years and had decided to close the works last March 10, but 650 men and boys who earn their living from it became alarmed at the prospect of being thrown on a dole and made an arrangement with the management by which the colliery is to be carried on by a guaranty fund subscribed by the employees and the people of the district.

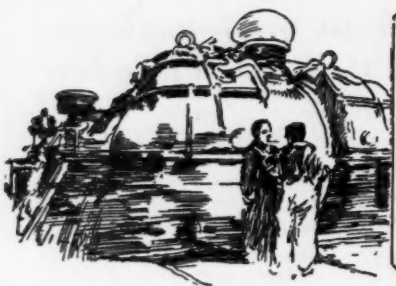
A guaranty fund of more than £200 was raised March 16 by individual subscribers of a few pounds and shillings each from the miners, who will get 5 per cent interest if the colliery pays, but will lose it all if it is run at a deficit. This is the first experiment of the kind in Great Britain.

Lawton Defeats Hessler for Indiana Presidency

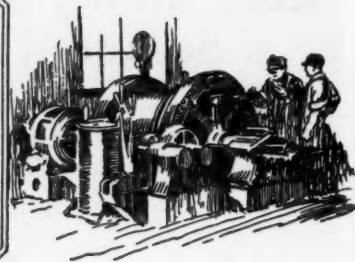
Chicago, Ill., March 23. — Tyler G. Lawton, of Bicknell, defeated John Hessler, the present incumbent, in the race for president of District No. 11, (Indiana) United Mine Workers, according to an official canvass completed by the tellers March 23. Lawton received 8,954 votes and Hessler 6,955. Harvey Cartwright, of Bicknell, defeated vice-president T. I. Roberts, of Terre Haute, by 1,917 votes and in the contest for international board member C. C. Webster, of Terre Haute, defeated the present member, W. D. Van Horn, by only 172 votes. William Mitch was re-elected secretary-treasurer. President Hessler, who has ruled the miners of Indiana for years, charged certain men with corruption in the first count and said he would resign even if the recount of the ballots favored him.

Citing sections of the union constitution which prevent the operation of coal mines by miners on a co-operative basis in violation of the Terre Haute agreement, the union officials of District No. 11 notified every local union in the district that any member of the organization who in the future affiliates himself with a co-operative mining venture in violation of the Terre Haute agreement will face expulsion. This action was the result of a meeting called by International President John L. Lewis in Indianapolis, March 18.

The Seaboard Air Line Ry. has asked for bids April 1 on 1,500,000 tons of high-volatile run of mine locomotive coal to be delivered during the course of the year at 10 destinations along the route.



Practical Pointers For Electrical And Mechanical Men



A Serious Trouble Can Often Be Remedied Easily

A small 5-kw. two-bearing motor-generator set furnished current for exciting the synchronous field of a large motor-generator. It was installed for the purpose of obtaining a sufficiently low voltage for excitation purposes, the rated direct-current voltage of the large generator being suited to our 500-volt trolley system.

The motor of the exciter set was connected to the power supply line through a transformer, the primary of which was connected in parallel with the main leads of the large motor. When the large motor-generator set was started, the exciter set started also. This arrangement did away with a starter for the small outfit.

The synchronous field of the main motor was connected directly to the armature of the exciter generator, and the field of the latter was connected through a rheostat across its armature for proper control of the generated current and obviously the synchronous field of the large motor.

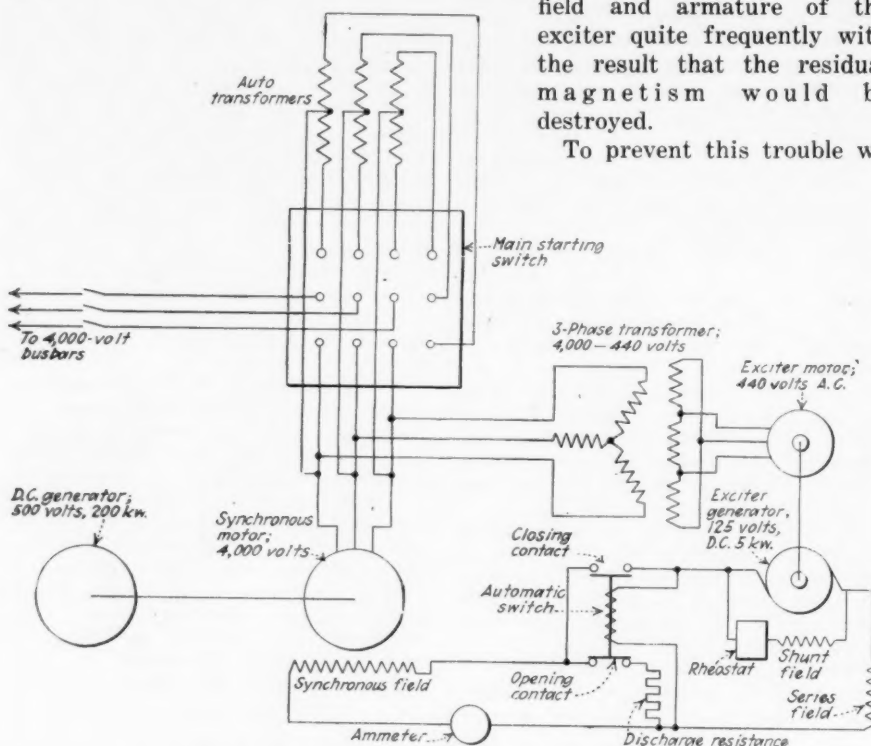
Periodically we had trouble due to the little generator losing its residual magnetism, and we were of necessity always forced to excite this field with a battery of dry cells before it would pick up its voltage.

Without a doubt the reason for this periodic loss of residual magnetism was the generation of a "kick-back" voltage from the synchronous field into the field of the exciter generator. This would occur in the field and armature of the exciter quite frequently with the result that the residual magnetism would be destroyed.

To prevent this trouble we

obtained an automatic switch which was equipped with two contacts, one which closed and one which opened whenever power was applied to the switch. The operating coil of this switch was connected across the armature of the exciter generator. The circuit-closing contact was connected in one of the wires between the exciter and the synchronous field. The circuit-opening contact was used to open a circuit which connected a discharge resistance across the synchronous field to shunt it while the large machine was being started. The installation of this switch has prevented any further annoyance of this kind. Now, when the large machine is started the starting switch is closed and both the large and the small motor-generator sets begin to run. As long as the contactor switch is open the synchronous field is short circuited but when the contactor closes exciting current is applied to the large synchronous motor. Due to the characteristics of the small generator its voltage does not build up until the running switch of the big machine is closed and the latter is up to full speed. Thus any inductive voltage generated in the synchronous field of the large motor is dissipated in the discharge resistance. Later the automatic switch closes the circuit between the exciter and the synchronous field of the large synchronous motor.

ELECTRICAL ENGINEER.



Operating Diagram of an Automatic Contactor in the Field Circuit of a Synchronous Motor

A separate starting switch for the little exciter set is not necessary with this connection. When the power is supplied to the large motor-generator set the exciter unit starts also. The automatic contactor keeps the synchronous field short circuited until the exciter set is up to speed; then it closes and supplies the exciting current to the synchronous field winding of the large motor.

Empty Carbide Can Serves As Rotor for Testing

To determine whether the stator winding of a polyphase motor has been properly connected the group connections may be traced, but this method is tedious and its accuracy is dependent on the human element. Checking by means of direct current and a compass is another method commonly used, but here also the accuracy depends on the experience and the carefulness of the person making the test.

The only sure means of determining if the winding, when connected



Fig. 1—Assembled Ready for Test

The stator only was received for rewinding so an improvised rotor has been inserted ready to make a running test to check the connections.

to the line, generates a revolving magnetic field, is to make a running test. The usual way to do this is, of course, to assemble the complete motor and give it a light load test. In our winding department we often receive from our customers the stators only, for rewinding. To give these stators a running test we have adopted the plan of using a thin steel cylinder as a rotor. Such a cylinder should be only slightly smaller than the inside of the stator to be tested and should be mounted on a small shaft extending through the center, as shown in Fig. 1.

The ends of the cylinder need not necessarily be of metal; wood will do just as well. Fig. 2 shows how the shaft, on which the cylinder is mounted, is supported by hand dur-

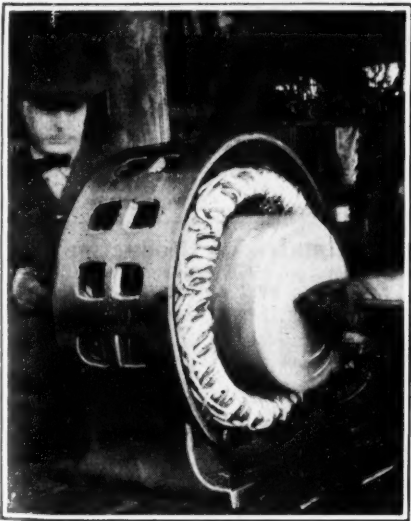


Fig. 2—Proving the Connections

The empty carbide can is doing its best to keep up with the rotating field. The shaft can be supported by hand, for it takes only a few moments to make the test.

ing the short time that is required to make a test. In this particular case the stator of a 15-hp., 2,300-volt, 3-phase, 60-cycle, 865-r.p.m. motor is being checked, and an empty carbide can is being utilized as a rotor. Although only 440-volt energy is being used on this stator it is the usual practice to connect the winding to about half-normal rated voltage. If the voltage used is extremely low it may be necessary to start the cylinder by hand after which, if the stator is properly connected, it will attain full speed in a few minutes.

B. SHELI,

President and general manager
Guyan Machine Works.
Logan, W. Va.

Adjustable Armature Rack Made from Old Rail

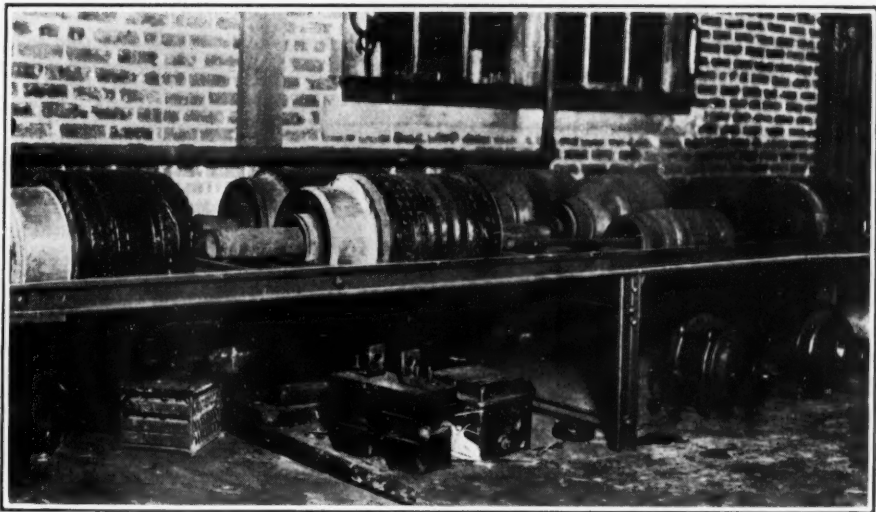
Storing spare armatures on the floor has several disadvantages. They must be moved occasionally if the

sizes and weights of armatures used in mine work. The ordinary range is from the 50-hp. armatures of 10-ton locomotives and mining machines, down to the small armatures of locomotive reel motors.

USED OLD TRACK STEEL

The adjustable rack illustrated herewith is in use at the Stanaford, W. Va., shop of the Elkhorn Piney Coal Mining Co. It was designed by Reuben Lee, chief electrician of the Stanaford mines. The entire rack is made from old track steel, 45-lb. rail being used for the side pieces and 16-lb. for the cross-members. The ends of the lighter rail rest on the base flanges of the heavy side rails, and tie rods clamp the cross-pieces in any desired position. This adjustable feature allows for a rearrangement of the rack at any time to suit the lengths of armatures being stored.

A lifting band and a portable



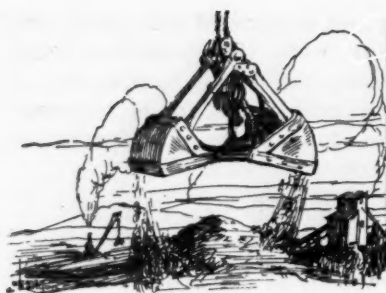
Raise Spare Armatures Above Shop Floor, Preventing Injury

This adjustable armature rack was made of old steel rails. The 16-lb. cross-members rest on the base flanges of the 45-lb. side pieces. By loosening the tie rods, the cross-pieces can be slid along so as to rearrange the rack to suit any of the various lengths of armatures.

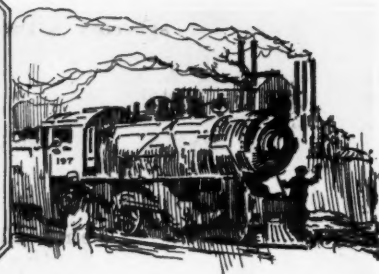
shop is to be kept clean; the floor is liable to be damp, in which case the coils will absorb moisture; while removing or inserting lifting bands the armatures generally are tipped so that the weight rests on the coil ends; armatures may be rolled on to a sharp piece of metal which will cut the insulation; damage may result by armatures being bumped by material which is wheeled or otherwise moved along the floor, and lastly the method is a wasteful use of floor space.

Simple as it may seem at first thought, it is really not an easy matter to design a compact armature storage rack, because of the various

crane are used in moving the armatures. It will be noted that several of them have short pieces of pipe over the ends of the shafts. This is necessary on many of the ball-bearing types, the shafts of which are usually very short. Mr. Lee explained that the all-metal type of rack might be criticised because of the danger that the armature shafts might be damaged thereby, but added that during the several years they have been using it no evident damage has been done to any of the shafts. This objection could be overcome by fastening a thin strip of hardwood on top of each cross-rail.



Production And the Market



Business in Bituminous Coal Market Sinks To Disheartening Level

Bituminous coal consumers seem to be getting more indifferent, though that was not believed possible, and the market continues to sink lower in the depths. Efforts to move coal in the Chicago district are being exerted to the utmost, but results are far from encouraging. Recent price cuts have failed to stimulate demand for domestic grades and steam trade shows no increase in activity in spite of lowered production. Plenty of inquiries are afloat on contracts, but little actual business is being booked. Business is quite dull in Kentucky, but producers are hopeful of getting in on lake business early. Some encouragement also is felt over inquiries on contracts, though many concerns show a disposition to delay. West Virginia mines continue to feel the effect of the general sluggishness in all grades of coal, but despite the fact that most mines are running only about half time, more than 700,000 tons of smokeless is being produced per week.

Trade is good at the head of the lakes. Several of the mining companies of the Mesaba Iron range have placed orders and industrial demand also has been good, and the dock interests are more confident than ever of being able to clean up before navigation opens. Waning winter fitfulness characterizes the market at Milwaukee. Throughout Utah, Colorado, Kansas and the Southwest business is slow, only screenings being in demand in the latter section. Many mines are working less than half time and few report better than 50 per cent of normal output. Prices, however, remain firm.

Cincinnati Sees Hopeful Auguries

While the price situation shows no improvement at Cincinnati and "no bills" are numerous, the trade is taking hope with the placing of the Norfolk & Western contract and the fact that large industries are signing up, though the smaller firms continue to play the spot market. Extreme quiet prevails in the Columbus, Cleve-

land, Buffalo and Pittsburgh markets. Nearly all the regular operations in the Pittsburgh district are said to contemplate closing about April 1.

Unstable conditions pervade the New England market, where springlike weather and extremely light inquiry are the rule. Textile plants are consuming more coal and the use of fuel oil is falling off, however. Trade at New York, Philadelphia and Baltimore is very dull, consumers showing practically no interest except in filling immediate requirements. Contracting is slow, closings being made, if at all, at spot-market figures. At Birmingham the steam market is holding up fairly well and dealers' contracts for domestic grades exceeded expectations on the new spring schedules.

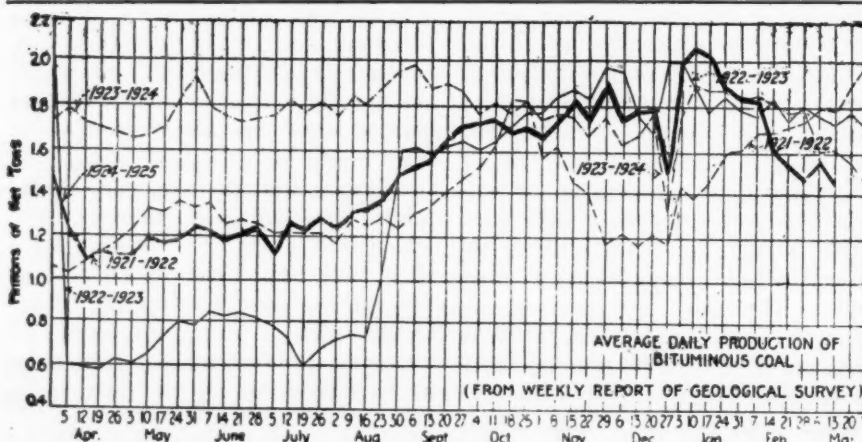
Company Anthracite Prices Reduced

Anthracite business is extremely slow in all markets. Reductions of 50c. in domestic and No. 1 buckwheat prices by company producers this week, however, are expected to cause a pickup in buying, as retailers and consumers' stocks are low. All sizes except rice, barley and birdseye moved slowly last week.

Coal Age Index of spot prices of bituminous coal sagged again last week, standing on March 23 at 163, the corresponding price for which is \$1.97, compared with 165 and \$1.99 respectively the preceding week.

Dumpings of coal for all accounts at Hampton Roads in the week ended March 19 totaled 434,437 net tons, compared with 387,348 tons the week before.

Production of bituminous coal again took a turn downward in the week ended March 14, when, according to the Geological Survey, the output was estimated at 8,623,000 net tons. This compares with 9,385,000 tons in the preceding week, as shown by revised figures. Anthracite output in the week ended March 14 was 1,656,000 net tons, an increase of 1,000 tons over that of the week before.



Estimates of Production

(Net Tons)

BITUMINOUS

	1923-1924	1924-1925
Feb. 28	11,061,000	8,854,000
March 7 (a)	9,944,000	9,385,000
March 14 (b)	9,943,000	8,623,000
Daily average	1,657,000	1,437,000
Coal yr. to date (c) ..	539,116,000	451,310,000
Daily av. to date	1,847,000	1,538,000

ANTHRACITE

Feb. 28	1,866,000	1,605,000
March 7	1,882,000	1,655,000
March 14	1,941,000	1,656,000
Coal yr. to date (c) ..	87,552,000	84,461,000

COKE

March 7 (a)	326,000	243,000
March 14 (b)	307,000	243,000
Cal. yr. to date (c) ..	2,971,000	2,712,000

(a) Revised since last report. (b) Subject to revision. (c) Minus one day's production to equalize number of days in the two years.

No Market in Midwest

The struggle to sell coal in the Chicago district in keen—and disheartening. Domestic sizes of Illinois and Indiana union coal are in no demand whatever and the recent cuts made on lump—led by the 50c. drop in southern Illinois lump and egg to \$2.75—have not stimulated buying any to speak of. Eastern Kentucky and West Virginia coals are getting all the business there is, which isn't much, at low prices. Steam trade is not active in spite of low production. Western Kentucky is getting a good deal of it with its low priced mine-run offered at \$1.25 or so. The rest of the demand is filled with southern Illinois screenings at \$1.90 and central Illinois at \$1.75@1.85, with an occasional car of Belleville fines at \$1.45@1.60. The main effort of coal agencies now is to sew up contracts. There are many inquiries but few signatures on the dotted lines.

There was plenty of coal on hand in nearly every mine in the southern Illinois field, with the exception of screenings, and some mines had a good supply of these held back when the tornado went through the northern part of the Franklin County field on the 18th. The storm has resulted in putting other things in the background but there is still plenty of coal on hand. Railroad tonnage shows up light. Strip mines seem to be getting in good work and are crushing mine run, but their prices are about 50c. below the regular prices on everything.

Quietness prevails in St. Louis coal circles. There is a little domestic moving although in small quantities. All the demand is for cheaper coals and dealers are pretty well loaded. Middle grade and high grade coals are slow. There is some wagonload steam, and carload steam for screenings trade is good. Country domestic is unusually quiet and there is no call for country steam.

Kentucky Eyes Lake Trade

The Louisville market continues quite dull, although there are a number of contracts on which inquiries have been placed for prices, and this is brightening the general situation up somewhat.

Some of the industrial concerns whose contracts have expired are buying in the open market for the time being, a few having signed up new contracts already, but a number who are close students of the coal market and who have studied conditions are in no hurry to contract.

Prices have been quite steady over the week. Western Kentucky operators are asking \$1.25@1.40 for screenings, but can't get much over \$1.20 on this market, due to the fact that eastern Kentucky screenings are quoted at 85c. and up, and while the freight rate from eastern Kentucky is \$1.69 as against \$1.26 for western Kentucky, the difference in price prevents the western market from advancing prices here.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Mar. 24 1924	Mar. 9 1925	Mar. 16 1925	Mar. 23 1925†
Smokeless lump.....	Columbus.....	\$3.60	\$3.60	\$3.10	\$3.00@ \$3.25
Smokeless mine run.....	Columbus.....	2.10	1.90	1.90	1.75@ 2.10
Smokeless screenings.....	Columbus.....	1.60	1.15	1.15	1.10@ 1.25
Smokeless lump.....	Chicago.....	3.25	3.10	3.10	3.00@ 3.25
Smokeless mine run.....	Chicago.....	2.10	1.75	1.75	1.50@ 2.00
Smokeless lump.....	Cincinnati.....	3.25	3.25	3.25	3.00@ 3.50
Smokeless mine run.....	Cincinnati.....	2.20	2.00	2.00	2.00
Smokeless screenings.....	Cincinnati.....	1.75	1.60	1.60	1.60
*Smokeless mine run.....	Boston.....	4.65	4.30	4.30	4.25@ 4.50
Clearfield mine run.....	Boston.....	2.05	1.95	1.95	1.75@ 2.20
Cambria mine run.....	Boston.....	2.60	2.30	2.30	2.10@ 2.50
Somerseset mine run.....	Boston.....	2.30	2.10	2.10	1.90@ 2.35
Pool 1 (Navy Standard).....	New York.....	3.00	2.65	2.65	2.50@ 2.85
Pool 1 (Navy Standard).....	Philadelphia.....	3.00	2.70	2.65	2.50@ 2.85
Pool 1 (Navy Standard).....	Baltimore.....	3.00	2.25	2.10	2.00@ 2.25
Pool 9 (Super. Low Vol.).....	New York.....	2.20	2.05	2.05	1.90@ 2.25
Pool 9 (Super. Low Vol.).....	Philadelphia.....	2.30	2.05	2.00	1.85@ 2.20
Pool 9 (Super. Low Vol.).....	Baltimore.....	2.25	1.85	1.85	1.75@ 2.00
Pool 10 (H.Gr. Low Vol.).....	New York.....	1.95	1.75	1.75	1.65@ 2.00
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	1.85	1.70	1.65	1.55@ 1.80
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	1.90	1.70	1.75	1.65@ 1.85
Pool 11 (Low Vol.).....	New York.....	1.40	1.55	1.55	1.40@ 1.70
Pool 11 (Low Vol.).....	Philadelphia.....	1.65	1.55	1.55	1.50@ 1.60
Pool 11 (Low Vol.).....	Baltimore.....	1.60	1.50	1.50	1.45@ 1.55

High-Volatile, Eastern

Pool 54-64 (Gas and St.).....	New York.....	1.50	1.50	1.50	1.40@ 1.60
Pool 54-64 (Gas and St.).....	Philadelphia.....	1.60	1.45	1.45	1.40@ 1.50
Pool 54-64 (Gas and St.).....	Baltimore.....	1.70	1.65	1.70	1.65@ 1.75
Pittsburgh se'd gas.....	Pittsburgh.....	2.55	2.50	2.40	2.30@ 2.50
Pittsburgh gas mine run.....	Pittsburgh.....	2.30	2.20	2.00	1.95@ 2.10
Pittsburgh mine run (St.).....	Pittsburgh.....	2.10	1.95	1.80	1.75@ 1.90
Pittsburgh slack (Gas).....	Pittsburgh.....	1.35	1.30	1.30	1.30@ 1.40
Kanawha lump.....	Columbus.....	2.55	2.10	2.10	2.00@ 2.25
Kanawha mine run.....	Columbus.....	1.55	1.50	1.50	1.40@ 1.60
Kanawha screenings.....	Columbus.....	1.05	.55	.55	.75@ .90
W. Va. lump.....	Cincinnati.....	2.50	2.05	2.05	1.75@ 2.50
W. Va. gas mine run.....	Cincinnati.....	1.30	1.35	1.35	1.35@ 1.50
W. Va. steam mine run.....	Cincinnati.....	1.30	1.30	1.30	1.25@ 1.40
W. Va. screenings.....	Cincinnati.....	.85	1.05	1.05	.75@ 1.10
Hoeking lump.....	Columbus.....	2.55	2.35	2.35	2.25@ 2.50
Hoeking mine run.....	Columbus.....	1.70	1.50	1.45	1.35@ 1.60
Hoeking screenings.....	Columbus.....	1.05	1.10	.85	1.00@ 1.15
Pitts. No. 8 lump.....	Cleveland.....	2.35	2.30	2.30	1.90@ 2.75
Pitts. No. 8 mine run.....	Cleveland.....	1.80	1.80	1.80	1.75@ 1.85
Pitts. No. 8 screening.....	Cleveland.....	1.25	1.40	1.35	1.30@ 1.40

Midwest	Market Quoted	Mar. 24 1924	Mar. 9 1925	Mar. 16 1925	Mar. 23 1925†
Franklin, Ill. lump.....	Chicago.....	\$2.85	\$3.10	\$3.10	\$2.75
Franklin, Ill. mine run.....	Chicago.....	2.35	2.35	2.35	2.25@ 2.50
Franklin, Ill. screenings.....	Chicago.....	1.80	2.00	2.10	1.90@ 2.00
Central, Ill. lump.....	Chicago.....	2.60	2.85	2.50	2.25@ 2.60
Central, Ill. mine run.....	Chicago.....	2.10	2.20	2.20	2.15@ 2.25
Central, Ill. screenings.....	Chicago.....	1.55	1.90	1.90	1.80@ 2.00
Ind. 4th Vein lump.....	Chicago.....	2.85	2.85	2.85	2.60@ 2.75
Ind. 4th Vein mine run.....	Chicago.....	2.35	2.35	2.35	2.25@ 2.50
Ind. 4th Vein screenings.....	Chicago.....	1.85	1.95	1.95	1.90@ 2.00
Ind. 5th Vein lump.....	Chicago.....	2.60	2.50	2.50	2.25@ 2.40
Ind. 5th Vein mine run.....	Chicago.....	2.10	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings.....	Chicago.....	1.60	1.80	1.80	1.75@ 1.85
Mt. Olive lump.....	St. Louis.....	2.85	2.85	2.85	2.75@ 3.00
Mt. Olive mine run.....	St. Louis.....	2.50	2.35	2.35	2.25@ 2.50
Mt. Olive screenings.....	St. Louis.....	1.50	1.75	1.75	1.75
Standard lump.....	St. Louis.....	2.30	2.50	2.50	2.25@ 2.60
Standard mine run.....	St. Louis.....	1.95	1.80	1.80	1.75@ 1.85
Standard screenings.....	St. Louis.....	1.30	1.40	1.55	1.50@ 1.75
West Ky. block.....	Louisville.....	2.85	1.85	1.85	1.75@ 2.00
West Ky. mine run.....	Louisville.....	1.60	1.35	1.35	1.25@ 1.50
West Ky. screenings.....	Louisville.....	1.30	1.25	1.25	1.25@ 1.30
West Ky. block.....	Chicago.....	2.60	2.00	1.85	1.75@ 2.00
West Ky. mine run.....	Chicago.....	1.20	1.35	1.25	1.15@ 1.35

South and Southwest

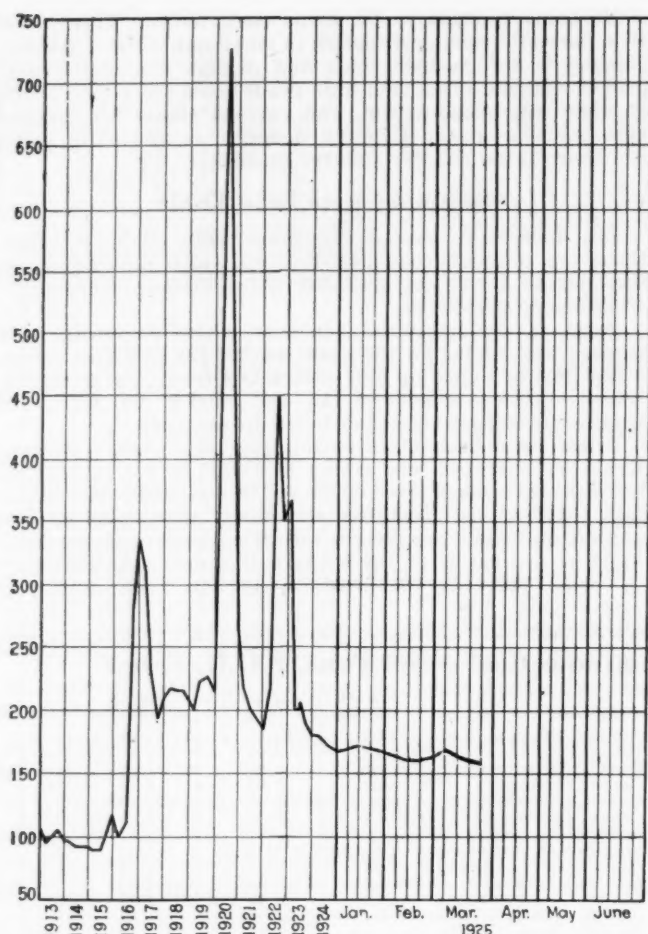
Big Seam lump.....	Birmingham.....	2.60	2.60	2.75	2.25@ 2.50
Big Seam mine run.....	Birmingham.....	2.00	1.75	1.75	1.50@ 2.00
Big Seam (washed).....	Birmingham.....	2.20	1.85	1.85	1.75@ 2.00
S. E. Ky. block.....	Chicago.....	2.85	2.35	2.25	2.00@ 2.25
S. E. Ky. mine run.....	Chicago.....	1.60	1.50	1.35	1.25@ 1.50
S. E. Ky. block.....	Louisville.....	3.00	2.25	2.25	2.00@ 2.25
S. E. Ky. mine run.....	Louisville.....	1.70	1.35	1.35	1.25@ 1.50
S. E. Ky. screenings.....	Louisville.....	.95	1.00	1.00	.85@ 1.10
S. E. Ky. block.....	Cincinnati.....	2.85	2.10	2.10	2.00@ 2.50
S. E. Ky. mine run.....	Cincinnati.....	1.45	1.35	1.35	1.25@ 1.50
S. E. Ky. screenings.....	Cincinnati.....	.85	1.10	1.10	.90@ 1.25
Kansas lump.....	Kansas City.....	4.50	4.25	4.25	4.00@ 4.50
Kansas mine run.....	Kansas City.....	3.25	3.00	3.00	2.75@ 3.00
Kansas screenings.....	Kansas City.....	2.50	2.50	2.60	2.75

*Gross tons, f.o.b. vessel, Hampton Roads. †Advances over previous week shown in heavy type; declines in italics.
† The term block is used in order to conform to local practice, but the same coal is being quoted as heretofore.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	March 24, 1924	March 16, 1925	March 23, 1925†
Broken.....	New York.....	\$2.34	.....	.....	.....
Broken.....	Philadelphia.....	2.39	.....	.....	.....
Egg.....	New York.....	2.34	.....	.....	.....
Egg.....	Philadelphia.....	2.39	.....	.....	.....
Egg.....	Chicago.....	5.06	.....	.....	.....
Stove.....	New York.....	2.34	.....	.....	.....
Stove.....	Philadelphia.....	2.39	.....	.....	.....
Stove.....	Chicago.....	5.06	.....	.....	.....
Chestnut.....	New York.....	2.34	.....	.....	.....
Chestnut.....	Philadelphia.....	2.39	.....	.....	.....
Chestnut.....	Chicago.....	5.06	.....	.....	.....
Pea.....	New York.....	2.22	.....	.....	.....
Pea.....	Philadelphia.....	2.14	.....	.....	.....
Pea.....	Chicago.....	4.79	.....	.....	.....
Buckwheat No. 1.....	New York.....	2.22	.....	.....	.....
Buckwheat No. 1.....	Philadelphia.....	2.14	.....	.....	.....
Rice.....	Philadelphia.....	2.22	.....	.....	.....
Rice.....	New York.....	2.14	.....	.....	.....
Barley.....	Philadelphia.....	2.22	.....	.....	.....
Barley.....	New York.....	2.14	.....	.....	.....
Birdseye.....	New York.....	2.22	.....	.....	.....

* Net tons, f.o.b. mines. †Advances over previous week shown in heavy type; declines in italics.



Index	1925				1924	
	March 23	March 16	March 9	March 2	March 24	March 17
Weighted averaged price...	\$1.97	\$1.99	\$2.02	\$2.13	\$2.13	\$2.13

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and, second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke: 1913-1918," published by the Geological Survey and the War Industries Board.

Although some eastern Kentucky operators are quoting as high as \$2.50 for best lump or block coal, \$2 is about the top of the present market as a result of heavy offerings of coal on track, and the fact that even West Virginia 4-in. smokeless has been offered at the \$2 level.

Lake cargo coal is looked upon as the only factor that can materially improve conditions in eastern Kentucky. Western Kentucky will get the usual stove-coal demand from the South and probably a fair movement to Michigan and the Northwest, but there isn't any prospective tonnage in sight which will enable mines to operate on any active production basis before midsummer, if then.

Sluggishness features all grades of coal in West Virginia, both smokeless and high volatile. Although reduction in output and the elimination of much "no bill" coal that was floating around in the market for a time has checked further declines, more than 700,000 tons of smokeless is being produced each week, although as a rule mines are not working more than half a week and some mines even less than that.

Northwest Trade Is Spotty

Trade is good at Duluth this week, with several of the mining companies of the Mesaba Iron range coming into the market and several large orders booked from these sources. Industrial demand, as well, remains good, and there is no reason to believe that the docks will not clean up before the opening of navigation. Prices are firm, and the drop in screenings reported last week seems to have been overcome. Screenings are virtually back to their old levels again, with the exception of one dock which still continues to sell at 25c. off.

Shipments this month, coal men say, have been better than last month for the first half of the month. This, of course, is an estimate, but it can be regarded as fairly accurate. The weather has been mild the last two or three days, however, and this is likely to influence demand.

The start made by the mining companies will undoubtedly affect other companies, it is thought. These companies do not care to get too much ore above ground before May 1, as it is on this day that the assessment is made. One mining company here has indicated that it will use approximately 12,000 tons of steam coal this year as against 5,000 tons last year, if present conditions are maintained. This looks good. An increase in ore production would mean more shipping and, therefore, more bunker coal.

On March 23 an advance of 54c. went into effect on Kentucky and West Virginia coal, which will help the docks on the Twin City trade. A reduction of 18c. on bituminous from mines to lower lake ports also is expected, which will add its bit to the general optimism.

Undoubtedly a smaller tonnage of hard coal will be brought up next season because of the Pocahontas demand. At first docks expected to bring up at least 1,250,000 tons, but the final figure undoubtedly will be much less than this.

The demand for coal in Milwaukee is slow and spasmodic, such as characterizes the waning of winter. Industries are taking normal quantities of fuel, but householders are ordering only when they are compelled to, and then calling for merely sufficient to get along. Dock dealers are clearing up preparatory to restocking for another year's demand, and are looking to the mines for early shipments up the lakes. Prices remain unchanged.

Western Business Is Slow

Of Southwestern coal, only screenings are in demand, and they are being quoted at \$2.75 a ton. Many Kansas mines are working less than half time, and few report more than 50 per cent of normal production. The same condition exists throughout the Southwest, with the exception of Arkansas, where production is almost at the vanishing point.

Continued warm weather in Colorado has caused a material falling off in orders for domestic coal. As a result the mines are not averaging over 60 per cent running time. Several of the small mines have closed down. The downward revision in the wage scale by several of the large operators in the state has had a tendency to check orders for coal as the trade expects substantial reductions in prices soon. Storage prices probably will go into effect April 1 and it is expected that domestic lump coal will be reduced from \$5.25 to at least \$4. There has been no change in prices on domestic lump, which is now \$5.25 on Walsenburg and Canon City lump, and \$4.25 on nut. There is an oversupply of labor, transportation conditions being excellent.

Production in Utah continues around two days a week. A few of the large mines that closed recently on account of market conditions are still idle. The demand for coal is light in every section of territory served by the Utah operators. There is no contracting of any moment at this time, and business would be even slower if it were not for the snowstorms of the past week, which have lowered temperatures and stimulated domestic demand somewhat. The low production is making slack a little scarce, though all orders are being filled. The metal mining and smelting industry continues to be the most important industrial customer. Prices appear to be as firm as ever.

Hopeful Signs at Cincinnati

Numerous "no bills" are lying between Cincinnati and the mines and there has been little to indicate price betterment, but other hopeful signs indicate that the market is due for a come-back soon. The Norfolk & Western Ry. placed its contract the other day at around \$1.75 a ton for high-volatile mine-run, \$2 for smokeless and \$1.50 for slack for the year. Large industrials are contracting more readily now, but smaller firms are playing the "spot market." Definite pricing on lake business is said to be encouraging, figures now revolving around \$2 on 2-in. and \$1.75 for mine-run for high volatile and \$2.25 for Pocahontas mine-run.

Domestic business is in a slough. While smokeless is quoted at \$3.50 for lump and egg, the real market is around \$3@3.25. So far as high volatile is concerned there are two distinct ranges of price. Those who believe business can be stirred up by cutting values are naming \$1.75@2. Those who profess to have quality to their offerings make

it \$2@2.50 with specialized brands of southeastern Kentucky block up to \$3.50 in some instances. High-volatile egg is still a drug on the market and some of it has been worked through at mine-run prices. Generally speaking the range is \$1.50@2. Almost all varieties of mine-run can be had at \$1.25@1.50, and this takes in everything from steam to the higher types of byproduct. The strength that had been hovering around slack has failed to hold, the price cutters having thrown supplies on the market as low as 75c. in a frantic effort to do business. At that a top price of \$1.25 for slack has been made during the past week.

Retail business has not changed since the last flurry here. Pocahontas lump is \$7.50; run of mine, \$5.50@6; bituminous lump, \$6@6.50; slack, \$4.50@5. River business has everything in its favor with some large tows coming down as the stage steadies.

Columbus Market Featureless

Outside of a slight demand for screenings, the trade in Columbus is dull and featureless to the extreme. Both steam and domestic buyers are playing close to shore, preferring to clean up stocks rather than put in large amounts under present conditions.

The opening of the lake trade is expected to bring about a change in conditions. Outside of producing companies who control their own docks loading some coal, very little contracting or stir in the lake trade has taken place.

Steam trade is quiet and dull in every way. Large users outside of utilities are playing a waiting game, preferring to buy on the open market to take care of their weekly requirements. Railroads in some instances are asking for bids on bituminous mine run for the coming year. Contracting is still quiet although a large bulk of existing agreements expire around April 1. The attitude of many purchasing agents will be to buy at bargain prices rather than to renew agreements. Contract figures will be fully 25c. less than last year and in some cases even lower.

Domestic business is practically over for the season. Warm weather has succeeded the wintry blasts and consequently consumers are not buying to any extent. Retail prices are somewhat irregular with large reductions made to permit dealers to clean up their yards.

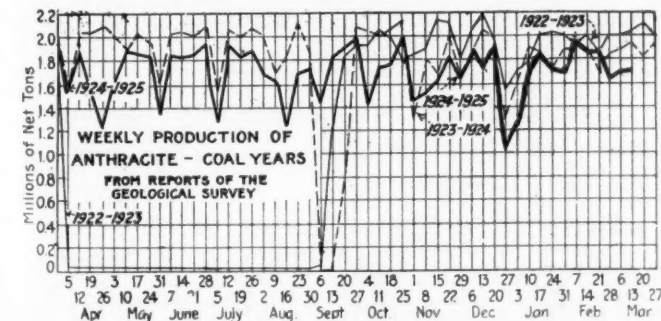
While output in eastern Ohio in the week ended March 14 increased 19,000 tons from the extreme low volume of the preceding week, the trade continues to sag. Milder weather has slowed down retail sales considerably, domestic consumers not purchasing more than barest needs to tide them over the remainder of the season. In many cases natural gas is being resorted to, which means that the retail yards are doing a minimum amount of purchasing from the producing end.

In the steam trade, inquiries are negligible, and with many manufacturers operating only part time, no improvement is looked for in the near future. Spot prices maintain recent levels, below which the remaining mines cannot afford to operate. Many mines in the district have closed indefinitely and almost daily there are rumors and reports that certain operations which will close down March 31, when certain contracts, which have kept the mines going, will expire.

Pittsburgh Dull and Irregular

Since the Cleveland meeting was called off Pittsburgh coal interests are said to contemplate forcing the issue on the union wage scale, as few operators have been earning their overhead. In fact it is reported that nearly all the regular mines of the district will be closed not later than April 1. A number have already closed.

The market continues in extremely poor condition, with



prices running somewhat lower than on Jan. 1 and rather irregular at that. There is no talk about lake business. The Pittsburgh district was so far out of the competition last season that the proposed revision of freight rates on lake coal would not let them in. It would bridge something like half the gap. The wage reduction in the Connellsville region improves somewhat the strategic position of the union operators in the Pittsburgh district.

On account of further decreased shipments of lump, slack has suddenly stiffened, and what market there is can be quoted at the moment at \$1.20@1.30 for steam and \$1.30 @1.40 for gas.

As March wanes coal production in central Pennsylvania decreases. Loadings in the week ending March 14 were 13,443 cars, compared with 14,131 in the previous week. The total of 27,547 carloads for the two weeks compares with 32,161 in the corresponding period in February. The low production is an indication of the seasonal effect that will be more keenly felt after April 1. Very few contracts have been closed for the year beginning April 1. The wage scale of 1917 is the basis for practically all dealings in coal, so that those union mines now under the 1924 scale have little hope for much of the season's business. Operators believe that their only hope lies in either going back to the 1917 scale or the success of the union in getting the men out on strike in the West Virginia field.

Business in bituminous at Buffalo is light and does not promise to revive till there is a firmer tone to affairs generally. The smelting furnaces in this district are not keeping up their active number and it looks as if there would be more shutdowns before any new ones start up. There is business, but not as much as was looked for. Quotations remain quiet at \$1.60@1.75 for Fairmont lump, \$1.40 @1.50 for mine run and \$1.25@1.40 for slack; \$2.25@2.50 for Youghiogeny gas lump, \$2@2.25 for Pittsburgh and No. 8 steam lump, \$1.40@1.60 for slack; \$1.75@2 for Allegheny Valley mine run.

Trade in New England Drags

Another week of spring weather and extremely light inquiry brought no cheer to the steam trade in New England. The market drags along with aggravating instability. The textile mills are using slightly increased tonnages, and the trend away from fuel oil is another hopeful indication, but there continues such an itch on the part of certain producers to increase daily output that it is exceedingly hard to net more than a minimum figure for spot coal. Even the highest grades of Pocahontas and New River can be bought as low as \$4.25 per gross ton f.o.b. vessel at Hampton Roads, and so long as this is matter of common knowledge the buyer will take things easy and bide his time. There are perhaps fewer aggressive efforts to place demurrage coal than was the case a month ago, but this is about all the comfort to be had in the current situation.

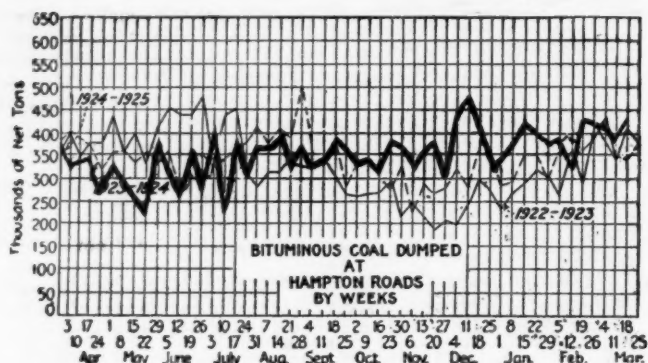
Accumulations at Hampton Roads continue to be a controlling factor in prices, and the weakness of the Western market for prepared coal apparently is in no wise improved. A much better articulated policy is called for if surplus coal is to be kept in the ground; otherwise, the trade may as well face a protracted period of low prices. A few operating groups are holding firmly to the \$4.50 price, sending tonnage forward only on order, but this is so exceptional that it serves only as a foil for those who choose to mine at as favorable a net return as a fickle market will offer.

Coastwise freights have an easier tone, and in a week or two doubtless will affect car prices at this end. Today \$5.40@5.50 per gross ton is an easy purchase for good grades of smokeless coal at Boston for inland delivery, but there is only light request.

All-rail from central Pennsylvania there is no apparent change. Most operations are either entirely shut down or are under such depression that movement is relatively very light. If there are gains in tonnage anywhere it can be assumed they are to the advantage of Hampton Roads coals.

Consumers Indifferent in New York

Nothing short of a heavy cut in production will benefit the soft-coal industry in the opinion of part of the trade at New York. There is too much spot coal available at low prices, although it is quite evident that the present tonnage is being distributed over a wide territory. An encouraging feature is the closing of many small mines and the report



that other mine owners contemplate shutting some operations.

Demand at New York remains quiet. Buyers cannot be interested above their immediate requirements and some are said to be drawing on their reserve stocks. A little sharper competition is looked for in some quarters now that the price of No. 1 buckwheat has been dropped to \$2.50 per ton.

Contracting continues to move slowly. Some negotiating is going on and there is a disposition to close provided consumers can cover themselves at about the prevailing spot market figures. Some producers are holding close to \$3 for pool 1 coals on contract to industrial consumers; \$2.15@2.35 for pools 71 and 9, and \$1.90@2 for pool 10 grades. Considerable railroad and cement business is hanging fire.

There is nothing encouraging in the Philadelphia market, and probably more mines are idle now than at any time for the past year. Prices have held at about the same level as last week, for the reason that is about the bottom and the next step means suspension of operations, which is a frequent occurrence now. Tide conditions are unchanged. It has been about three weeks since there was a clearance from the local piers. The usual amount of bunkering is being done, but that is not very heavy at any time.

At Baltimore the trade has for a number of weeks remained on an even keel, but conditions are far from satisfactory. Demand is very light and even the reduced production is ahead of the call. Excellent coals are being sold very cheap and in some cases at sacrifice prices. High-grade pool 9 coals have changed hands as low as \$1.70 f.o.b. mine, the market average running between \$1.75 and \$2. A partial resumption in export movement in the second week of March proved encouraging.

Spring schedules on domestic coal made effective March 14 at Birmingham elicited a better response in dealers' contracts than anticipated, a fairly good tonnage having already been booked for delivery through September. The current movement of domestic sizes, however, was stimulated little, if any, as moderate weather conditions obtain and retailers appear to be averse to taking on any more stocks than they can reasonably expect to dispose of through the month.

The steam market, while not especially active, is holding up moderately well and sales are of a satisfactory volume for this season. Spot sales probably are slightly under what they have been of late, but a good tonnage in the aggregate is still moving. The cement mills and the textile industry are still operating full and using a good tonnage. Railroads, some of which have been taking maximum deliveries on contracts, are again on the minimum basis. The Louisville & Nashville now has proposals out on its requirements for the next twelve months to be taken from this district, something like seventy cars per day, most of which is Big Seam washed, and probably will close contracts before the end of the month. Industrial contracts are being renewed at expiration, about the same tonnage being involved as previously taken. Bunker demand is somewhat lighter than in February, but is maintaining a healthier trend than usual. Quotations on steam coal have shown no change in the past week. Domestic prices, effective March 14, holding through April, are about as follows: Big-Seam lump, \$2.25@2.50; Carbon Hill, \$2.50; Cahaba, \$3.25@3.50; Black Creek, \$3.50; Corona, \$2.75; Montevallo, \$4.50; Montevallo-Straven (Montevallo seam), \$3.75. Egg sizes generally are 25c. under lump.

Production in the week of March 14 was 372,000 net tons.

Pickup in Anthracite Expected

At New York these are dull days for the hard-coal producers, but with the companies announcing a reduction of 50c. in domestic prices and a cut of 50c. in the price of No. 1 buckwheat it is expected that buying will pick up. The reduction on egg, stove, chestnut and pea was discounted in that retail dealers have been buying from some independent producers for the past couple of weeks subject to the new prices. The price for broken coal was not reduced.

Movement of all coals with the exception of rice, barley and birdseye was slow last week. The three smaller coals were in good demand and the better grades of rice and barley brought full circular figures. With regard to birdseye it is reported that the producers making it have been able to "pick up" all of the surplus supply.

Retail dealers as well as consumers' supplies are at a low point and heavy buying is looked for as soon as retail dealers announces new prices. It will be interesting incidentally to note the effect of the adoption of new size standards.

As March has been springlike almost from the beginning at Philadelphia, business has been slow. All mines are working short time and production is greatly diminished. With only a small amount of coal going out of yards, dealers have decided almost to a man that they will not buy until April. Due to curtailed production, the steam sizes are not so troublesome. Users of steam coal are slow to contract, however, seeming to feel that a reduction should be made in the present contract figures.

The hard coal trade at Baltimore has reached the stage that always comes to it when the closing days of March are not marked by "lion-like" weather. The season here is mild as a whole and there is a sharp cessation of late coal burning in domestic circles and all yards report light business. Until the fixing of spring prices there will be no general ordering by householders for restocking against the needs of next fall and winter.

Demand for anthracite at Buffalo is small now. Even talk of a strike next fall does not set consumers to buying coal. They seem to be convinced that there is fuel enough from some source, even if they do not buy any of the top-priced anthracite. The situation is serious.

The coke trade is not as brisk as it was expected to be in the city. Canada is still taking large amounts of it and appears to be satisfied with it. The lake anthracite trade is active, several big cargoes having been loaded and new shippers going into the movement at once. By the time the fleet is ready to sail a heavy tonnage will be ready to go, though the spring opening of the lakes will be early.

Coke Prices Weaken Further

There has been little trouble in the Connellsville coke region as a result of the reduction of wages by independents to the 1917 scale. Several offerings of second-quarter furnace coke contracts have been made in the past week at \$3.25, and a sale of 3,500 tons, for the balance of the month, was made at that figure. As this was not coke on track, but coke to be made, it is taken as making the market, which had previously been \$3.50@3.75. Contract is quotable at \$3.25@3.50 asked.

While the incident shows the coke operators yielding to the furnacemen's demands, they come out of it with much coke sold at \$3.50, whereas last year when this lower scale was in effect they got \$3@3.10 for third quarter and thought they had scored quite a point when they got the market up to \$3.25 on fourth-quarter contracts.

Spot foundry coke has been very dull and does not develop much of a market range. What there is of a market is quotable at \$4@4.75.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended March 7, 1925.....	930,009	163,531
Previous week.....	862,910	150,629
Week ended March 8, 1924.....	929,381	169,792

	Surplus Cars		Car Shortage
	All Cars	Coal Cars	
March 7, 1925.....	279,430	138,045	.....
Feb. 28, 1925.....	285,015	138,425	.....
March 7, 1924.....	144,426	64,115	2,001

Foreign Market And Export News

British Market Faces Serious Outlook; More Than 100,000 Miners Idle

Shipments of British coal in the last week have been heavier, due to the improved weather and the more punctual arrival of tonnage. Though this factor has meant a slightly easier position in the Welsh trade, the outlook is serious and more operators have decided to close down pits until the situation shows a really definite improvement. The only business to report are some inquiries, one from the Great Southern Ry. of Ireland for 240,000 tons of Monmouthshire locomotive coal over 12 months, and the other from the French State Rys. for 30,000 tons of small and large coals for delivery over three months.

Notices were given last week to 3,000 men to terminate their contracts at various collieries, and it is stated that the employment of 6,000 more men is in jeopardy. Two of the largest collieries in the Wrexham have closed down. Operators refuse to lower their prices and buyers are taking lots only as they are needed.

The economic position of the north English coal mining area is giving grave concern, and one of the largest producers of the best steam coals obtainable in the district has just closed down.

At the end of January over 100,000 miners were registered as unemployed. Since the beginning of 1924 415 pits employing 68,400 men have closed down, and 143, employing 12,000 men, have opened or reopened. At the larger collieries 159 pits are idle for two or more days per week, the time lost being 357,000 man shifts. The pits now closed, employing over 100 men, are as follows: Northumberland, 11; Durham, 23; Cumberland, 3; Lancashire and Cheshire, 2; North Staffordshire, 1; South Staffordshire and Worcester, 1; Warwick, 1; South Wales, 1; Lanarkshire, 7; Ayr and Dumfries, 1.

Production by British collieries in the week ended March 7, a cable to

Coal Age states, totaled 5,186,000 tons, according to official returns. This compares with an output of 5,271,000 tons in the preceding week.

Hampton Roads Market Sags

The Hampton Roads market last week neared its lowest level, with mines decreasing shipments and with inquiries continuing to drop to a low point. Some shippers pronounced business duller than at any time in the last eighteen months.

Some pool 2 coal was sold as low as \$3.88, while several cargoes of pool 1 went as low as \$4.10. The tone of the market was extremely dull, and despite the approach of the April 1 contract period inquiries were unusually light.

French Situation Unchanged; All Grades Quiet

The situation in the French market is unchanged, all grades of fuels being quiet. The output of French collieries, however, still has an easy outlet, though the same cannot be said for imported fuels. British and Belgian coals are offered profusely, but with no success, although the terms are most advantageous. Attempts to sell German coals in France outside of reparation deliveries has been tried anew, but almost without avail so far.

The new schedule of prices, effective March 1 and just published by the Administration of the Saar collieries, shows a general increase of from 6 to 7 fr., except on lower qualities, which are 1 to 4 fr. higher. The price of coke has risen 6 to 7 fr. and in exceptional instances 9 to 12 fr. The advance on sales to France varies from 4 to 7 per cent, according to grade and local competition. The temporary industrial rebate created last winter has been withdrawn.

To replace the tax on business the chamber of Deputies on March 1 voted

new regulations taxing coal 1.70 per cent ad valorem and coke 1.80 per cent.

During the first twenty-one days of February France and Luxemburg received from the Ruhr 186,600 tons of coal, 263,900 tons of coke and 30,400 of lignite briquets, a total of 480,900 tons. In February the Ruhr sent the O.R.C.A. 323,425 tons of coke.

U. S. Fuel Exports in February (In Gross Tons)

	1924	1925
Anthracite, tons.....	307,897	288,971
Value.....	\$3,440,803	\$3,139,950
Bituminous, tons.....	1,276,476	820,407
Value.....	\$6,574,200	\$4,014,355
Coke, tons.....	53,752	61,130
Value.....	\$512,358	\$533,014

Export Clearances, Week Ended March 19, 1925

FROM HAMPTON ROADS	
For New Brunswick:	Tons
Dan. Str. Paris, for St. John.....	4,569
Br. Str. Hochelaga, for St. John.....	6,965
For Nova Scotia:	
Amer. Schr. Thann for Halifax.....	3,508
For Spain:	
Dan. Str. Birte Jensen for Grao de Valencia	3,683
For Danish West Indies:	
Nor. Str. Besseggen for Curacao.....	4,066
For Jamaica:	
Nor. Str. Bratland for Kingston.....	2,175
For British West Indies:	
Nor. Str. Dagfin for Castries.....	3,035
For France:	
Ital. Str. Emanuele Aceame for Marseilles..	11,148
For Colombia, South America:	
Amer. Schr. Georgette for Cartagena.....	1,262
For Cuba:	
Dan. Str. Nordhavet for Havana.....	4,840
For French West Indies:	
Dan. Str. Nordfarer for Fort de France....	5,598

FROM BALTIMORE	
For Cuba:	
Dan. Str., Nordkap, for Daiquiri.....	5,100
For Algeria:	
Ital. Str., Mazzini, for Algiers.....	8,000
For Argentina:	
Br. Str., St. Oswald, for Buenos Aires.....	6,740

Hampton Roads Pier Situation

N.&W. Piers, Lamberts Pt.: March 12	March 19
Cars on hand.....	1,875
Tons on hand.....	117,093
Tons dumped for week.....	155,803
Tonnage waiting.....	15,000
Virginian Piers, Sewalls Pt.:	
Cars on hand.....	2,022
Tons on hand.....	131,400
Tons dumped for week.....	74,545
Tonnage waiting.....	5,214
C. & O. Piers, Newport News:	
Cars on hand.....	2,301
Tons on hand.....	111,810
Tons dumped for week.....	115,586
Tonnage waiting.....	13,150

Pier and Bunker Prices, Gross Tons

	March 14	March 21†
Pool 9, New York....	\$4.60@ \$4.90	\$4.70@ \$4.95
Pool 10, New York....	4.45@ 4.65	4.45@ 4.65
Pool 11, New York....	4.25@ 4.50	4.25@ 4.50
Pool 9, Philadelphia..	4.65@ 4.90	4.65@ 4.90
Pool 10, Philadelphia..	4.30@ 4.55	4.30@ 4.55
Pool 11, Philadelphia..	4.25@ 4.30	4.25@ 4.30
Pool 1, Hamp. Roads.	4.15	4.10
Pool 2, Hamp. Roads.	4.00	3.90
Pools 5-6-7, Hamp. Rds.	3.90	3.90

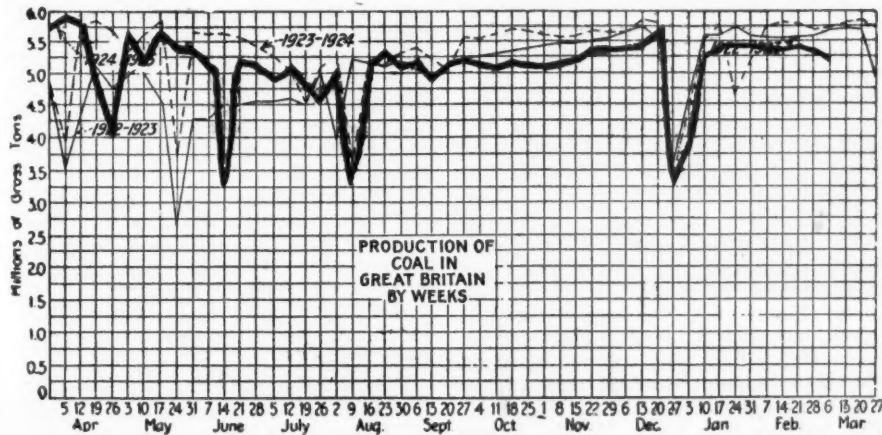
BUNKERS

Pool 9, New York....	\$4.85@ \$5.15	\$4.95@ \$5.20
Pool 10, New York....	4.70@ 4.90	4.70@ 4.90
Pool 11, New York....	4.50@ 4.75	4.50@ 4.75
Pool 9, Philadelphia..	4.80@ 5.10	4.80@ 5.10
Pool 10, Philadelphia..	4.60@ 4.75	4.60@ 4.75
Pool 11, Philadelphia..	4.45@ 4.65	4.45@ 4.65
Pool 1, Hamp. Roads.	4.25	4.20
Pool 2, Hamp. Roads.	4.10	4.00
Pools 5-6-7, Hamp. Rds.	4.00	4.00

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations by Cable to Coal Age		
Cardiff:	March 14	March 21†
Admiralty, large....	27s.	26s. 27s.
Steam smalls.....	15s. 6d.	15s. 6d.
Newcastle:		
Best steams.....	18s. 6d. @ 21s.	17s. 9d. @ 18s. 6d.
Best gas.....	20s. @ 21s.	20s.
Best Bunkers.....	18s. @ 6d.	18s. @ 6d.

† Advances over previous week shown in heavy type; declines in italics.





News Items From Field and Trade



ALABAMA

The Alabama By-Product Corporation placed its new addition of 25 Koppers ovens in commission March 14. The additional facilities give the corporation a capacity of 1,500 tons of coke daily from a battery of 100 Koppers ovens.

The Montevallo Coal Co., recently organized with a capital stock of \$2,000, purchasing the Aldrich mines and coal holdings of the old Montevallo Coal Mining Co., has filed notice of an increase in its capital stock to 2,000 shares of common of no par value and \$150,000 preferred stock. The main offices of the company have been moved from Birmingham to Aldrich, Shelby County, where the mines are situated. D. A. Thomas and associates are the incorporators of the new company.

According to advices received at Atlanta the U. S. Supreme Court has decreed that a judgment obtained against a mining company for alleged personal injuries is collectible from the company as a bankrupt. A test case was carried from Alabama in the suit of Henry Lewis vs. Montevallo Mining Co., in which a judgment had been rendered against the defendant for \$4,000, the company going into the hands of a receiver before the judgment was collected. Under the court ruling the bankrupt is liable for the above and a number of other claims of like character affirmed against the company prior to bankruptcy.

CALIFORNIA

Revival of coal mining on an enlarged scale in Shasta County is seen in the fact that a carload of machinery for the coal mines on Oak Run and Clover Creek arrived at Redding early in March. The shipment included a compressor, diamond drills, coal cars, track iron and mining tools. Development of coal in the region of Clover Creek and Oak Run is being pushed vigorously at three different points and thirty-six miners are employed. There are twelve men at each mine and they work in eight-hour shifts of four men each. The mines are on the lands of Ed. C. Frisbie, H. W. Stacher and Milton Hunt.

ILLINOIS

The Schoper mine, at Carlinville, reopened its mine March 9, with 600 men employed.

The Peabody Coal Co.'s Mine No. 6, located seven miles north of Springfield, broke the production record March 11, for the Springfield district, when 775 miners brought up 4,014 tons of coal

to the surface, working eight hours. The previous record was 3,177 tons, made by the same mine a year ago. P. W. MacMurdo is the superintendent.

William R. Brown, of the Illinois State Trust Co., East St. Louis, on March 13 was appointed receiver of the Shedd Coal Co., of Marion, Ill., by U. S. District Judge George W. English at East St. Louis. Creditors of the company agreed to the appointment. Brown succeeds Former Referee in Bankruptcy Charles B. Thomas, who resigned as receiver for the Shedd company and from four other receiverships following criticism of his official career. He also resigned as referee in bankruptcy. The Shedd company went into receivership on Feb. 9, 1924, on a bill filed by E. J. Wallace, of St. Louis, Mo., it being alleged there was an indebtedness of \$50,000 then due. The company was capitalized with \$100,000 stock, \$90,000 of which was issued. Thomas also resigned as receiver for the Southern Gem Coal Corporation, the Egyptian Coal & Mining Co., the Chicago Fuel Co. and the Southern Gem Coal Co., also as attorney for the receiver of the Dodds Coal Co. and for the receiver of the Alton, Granite & St. Louis Traction Co. A successor for Thomas was recently named in the Southern Gem Coal Corporation case.

INDIANA

Phil Penna, secretary of the Indiana Bituminous Coal Operators Association, on March 13 denied the report that all Hoosier mines would close April 1, to remain idle until the present wage scale expires, April 1, 1927. "There is nothing to that story about all the mines closing," Penna said. "Some mines will close because they cannot afford to stay open. The coal industry in Indiana is no different from any other. We can't mine coal as cheap as our neighbors in Kentucky and West Virginia. Therefore we can't sell it as cheaply. I guess some of us will have to close up shop. This is not a fight against unions. The time will never come when there will be no unions in the coal industry. I, for one, do not want it to come. I only want the unions to understand the situation and try to do their part."

A committee appointed to audit the books of the union commissary at Terre Haute made a report March 12 of the operations of the commissary from Jan. 18 to March 4. The commissary is being operated to feed miners in the Terre Haute field who are out of work. The total money received was \$2,294. The total expenditures were \$2,146.56. The balance on hand March 4 was

\$147.44. Money collected on the street, \$385.63. The balance in the bank, \$408.72. The average expense of the committee is 80c. per day for forty-nine days. The commissary has about eight hundred persons on its list. The distribution is on Wednesdays and Saturdays.

Prosperity Block Coal Co., Brazil, has filed a preliminary certificate of dissolution.

KANSAS

Repeated efforts to amend the Kansas workman's compensation law came to an end when on March 11, on the eve of the legislative session ending, the House defeated a bill the Senate had passed to fix the employer's liability for death at \$4,000 and to increase from \$6 a week to \$8 the minimum payable to an injured worker. A bill introduced at the beginning of the session to impose a 2 per cent production tax on coal and other minerals died in the hands of the committee to which it was referred.

Officials of District 14, United Mine Workers, after their return from international headquarters in Indianapolis, on March 16, issued a statement that International President Lewis assured them of full support in resisting any attempt of operators to force a deviation from the Jacksonville agreement. No move has been made toward a resumption of work at two mines in the district where the miners cleaned up after a notice was posted that the 1917 scale would be put into effect on March 1.

The Cherokee & Pittsburg Coal & Mining Co., a holding company for properties operated by the Jackson-Walker Coal & Mining Co., on March 14 completed the purchase of the coal rights to 320 acres of land six miles west and two miles south of Pittsburg from Francis M. Montee, of that city. The coal, which is the Cherokee vein, was purchased for \$32,000 and an option was taken on the surface of \$50 an acre. With the acquisition of this land the Cherokee & Pittsburg and Jackson-Walker companies now hold 4,000 acres close to Pittsburg. The tract just purchased was for future development and not for immediate use. The land the coal right on which Mr. Montee has just sold for \$100 an acre was purchased by him about 50 years ago for \$3.75 an acre. He bought the land from the Kansas City, Fort Scott & Gulf R.R., which obtained it as part of a government grant.

Following signing the bill enacted by the Kansas Legislature consolidating the Court of Industrial Relations, Pub-

lic Utilities Commission and State Tax Commission into the Public Service Commission, Governor Ben S. Paulen has appointed the following members of the new commission: L. T. Hussey, Lyndon; Clarence Smith, Topeka; W. C. Millar, Kiowa; Frank O'Brien, Fort Scott, and Jess W. Greenleaf, Kiowa. The new commission takes over all the powers of the industrial court and the law creating that court is unchanged except in regard to the officials who shall administer it.

KENTUCKY

It was reported from Harlan, on March 9, that the Henry Ford interests had bought the Harlan Fuel Co. mine at Yancey, which has a production of 1,500 tons of as fine a gas coal as is found in the fields, and which represents a comparatively new mine, with short hauls in its workings.

It was reported from Bevier, that troops guarding the Rogers Brothers Co. mine plant at that point had again been fired upon by snipers from a high ridge, under cover of darkness. About fifty shots were fired in the exchange.

The Hunter Mining Co. was incorporated in Uniontown, Ky., March 1, with a capital stock of \$60,000, and acquired 1,400 acres of coal land with mines thereon having a daily production of 350 tons, and they are to be developed to 600 tons. R. W. Hunter is president and R. B. Cox is secretary. W. L. Funkhouser, the vice-president, lives at Providence.

NEW YORK

The consolidated income account of the United States Distributing Corporation for 1924, according to its report, shows net income of \$729,762 after federal taxes, expenses and other charges, or \$3.92 a share on 145,907 no par common, compared with \$542,962, or \$4.93 on 110,000 shares common the previous year, after preferred dividends. Surplus is given at \$4,139,688 and total assets as of Dec. 31, 1924, at \$10,362,503.

OHIO

The Eaton Rhodes Co., of Cincinnati announces the discontinuance after April 1 of its coal department, which it has conducted for the last ten years. Green Finley, who has been in the coal department, with Reardon Harrison has formed the Harrison-Finley Coal Co. and has opened offices in the First National Bank Building, Cincinnati. James Layne, Jr., manager of the department, also contemplates opening a new company.

The U. S. Appellate Court, sitting in Cincinnati on March 6, reversed the decision handed down by Judge A. M. J. Cochran of the U. S. District Court for Eastern Kentucky in which he gave a verdict for \$72,838 to M. M. Tryree, of Huntington, W. Va., against the Kentenia Coal Co., of Cincinnati, which was sought in suit on the claim that it was for commissions on sales of coal. The Appellate court ruled that Judge Cochran erred in taking the case from the jury and instructing a verdict.

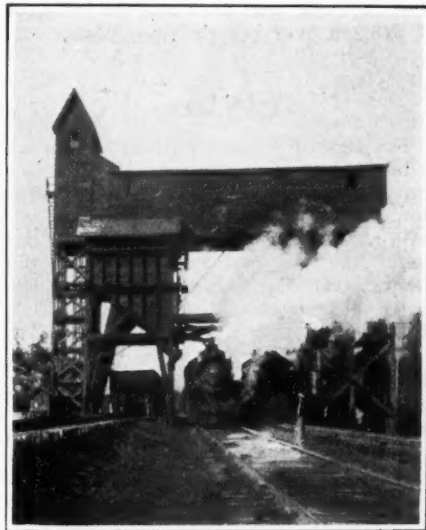
OKLAHOMA

Only four of the 25 coal mines in the Henryetta district remain open. This was the largest union field in operation in District No. 21. The new mines continuing to operate are working only one or two days each week.

PENNSYLVANIA

Organization of the new South Penn Collieries Co. was completed last week when deeds were filed conveying mineral rights of the Von Storch Collieries and the Legitts Creek Anthracite Co. to the new company for a total consideration of \$759,000. The Von Storch deed gives a surface area of approximately 100 acres in and about the breaker between the D. & H. R.R. and the Lackawanna River. All property, real and personal, the appurtenances belonging to the land, all buildings, mining fixtures and appliances, equipment of every character within and upon the ground is conveyed to the new company for a consideration of \$470,000. The deed also carries a stipulation that the D. & H. switch tracks be left for operation of the breaker. The tracts covered in the deed are the old estates of Theodore Von Storch, Philip C. Griffin, Parker Miller, Edward Griffin and Leopold Von Storch. The Legitts Creek deed takes in approximately 334 acres, the consideration for which was \$289,000.

The principle that if a mine worker is employed on part time on one job and the rest of his shift on another, he shall be paid the higher wage rate given for the two classes of work is established by a decision handed down recently by Umpire Charles P. Neill. The case in question was that of a runner in the Glen Lyon No. 6 mines of the Susquehanna Collieries Co., of Wilkes-Barre. The man was paid \$5.15 a day, but had to work also as a footman's helper, which schedules pay at \$5.30. His claim for the latter pay was sustained.



Coaling Chute at Stearns, Ky.

An engine is coaling on each of two tracks. This scene is taken on the Cincinnati, New Orleans & Texas Pacific Ry., now a part of the Southern Ry. system.

After being idle since Aug. 14, Centralia colliery of the Lehigh Valley Coal Co. resumed operations the second week in March. The mine shut down because of the necessity of erecting a new breaker to replace the old one, which was so dilapidated that it was no longer safe to operate.

Charles P. Neill, umpire of the anthracite conciliation board, in handing down a decision in the case of the Lehigh & Wilkes-Barre Coal Co. vs. the grievance committee of the Wanamie colliery and officers of Local No. 400, United Mine Workers, ruled that a local union has no right to set the maximum number of cars a miner is allowed to load in a day. The decision was a signal victory for the coal company. The company brought up the grievance after the local union had ruled that no miner at Wanamie working alone should load more than three cars daily, and no miner working with a laborer should load more than five cars daily.

TENNESSEE

W. H. Sterchi, and W. C. Baker, of 1212 Gratz street, Knoxville, with associates, March 1 acquired 4,200 acres of coal land in Cumberland county, and also a railroad connecting the tract with the Tennessee Central R.R.

UTAH

Memorial services were held at Castlegate, on Sunday, March 8, in honor of the 173 men who lost their lives on March 8 last year in one of the Utah Fuel Co.'s mines. The services were attended by more than a thousand men.

The Freed Interests of Salt Lake City have paid during the past week the sum of \$17,280 representing delinquent taxes on the Freed coal property in Huntington Canyon. It is stated that the direct purpose of making the settlement was to have the property clear of all tax encumbrances on account of the visit which Los Angeles (Cal.) capitalists will make to it in the next few weeks with the view of possible purchase.

Judge Tillman D. Johnson of the federal court has quashed the indictment against George A. Storrs and associates charged with using the mails to defraud in connection with the promotion of the Great Western Coal Mines Co. Defendants' counsel sought to set aside the indictment on the ground of alleged irregularities in the conduct of the case. It was held that the secrecy of the grand jury proceedings was violated by the transcribing of testimony for the use of the District Attorney's office. The indictment was returned last October and trial was due this month. The government will appeal.

A miner named Chris M. Anderson on behalf of himself and fourteen others has filed suit against the Independent Coal & Coke Co., asking for additional wages alleged to have been promised on a retroactive basis following the termination of the strike in 1922. The men responsible for the

suits worked during the strike at the reduced rate of wages which brought about the conflict. The wages of the coal miners of the state in general were increased at the termination of the strike.

WASHINGTON

The twenty-seventh annual report of the Pacific Coast Co. shows that the net operating earnings for 1924 were \$527,729, a gain over the previous year of \$213,762 and a gain over 1921 of \$384,495. The total assets of the company are \$24,645,366, including current assets of \$3,275,054, and the profit and loss balance shows a favorable column in the amount of \$2,771,693.

WEST VIRGINIA

For the fourth time since August, the tippie of the Whiteman mine of the Clarksburg Big Vein Coal Co., located near Wilsonburg, was damaged by an explosion on the night of March 15. The mine, a non-union operation, was not put out of commission this time because 100 lb. of dynamite failed to explode, and the 80 or more employees were at work as usual Monday.

With liabilities of nearly \$464,590.21 against total assets of about \$100,000, a voluntary petition in bankruptcy was filed March 16 by the Kistler Coal Co., of Kistler, Logan County. Depressed prices and low market conditions were responsible for the failure of the coal company, of which J. C. Miller, Jr., of Huntington, is president. Interests controlled by Mr. Miller purchased coal properties controlled by the Bengal Coal Co. and the Basic Coal Co., both of Kistler, about a year ago, and Walter Cunningham and Frank Enslow, of Huntington, owners of the controlling interests of the two companies, retained deeds of trust against Miller amounting to approximately \$400,000. The trust deeds represented the greater part of the company's liabilities. The equipment and mines were listed at \$387,114.27. A hearing on the petition will be given in Huntington within the next few weeks before John L. Witten, referee in bankruptcy. The Kistler Coal Co. is the second of the J. C. Miller, Jr. mines to file a bankruptcy plea in the last month. The first was the Mann Mining Co.

In connection with the buying of Norfolk & Western stock a story was circulated in the New York financial district March 18 that negotiations were in progress for the sale of the Pocahontas Coal Co., which is owned by the railroad company. It was declared that after the deal had gone through a stock dividend would be distributed to Norfolk & Western shareholders. In other quarters it was reiterated that the Pennsylvania R.R. was still eager to get control of the Norfolk & Western.

It having been stated by Roy Wright, special receiver of the Algonquin Coal Co., that he was unable to operate the company's mines without sustaining further losses, Judge L. C. Herndon, of the Circuit Court of Mercer County, has entered an order directing that the

mines be closed pending a final decision in the suit now pending to have the property of the company sold to satisfy the claims of creditors.

Eleven suits have been filed by the Fairmont-Chicago Coal Co. seeking possession of houses now occupied by union miners at Chesapeake. The suits charge unlawful entry and detainer and are similar to those brought by the Bethlehem Mines Corporation and the New England Fuel & Transportation Co. The company is endeavoring to resume operations on an open-shop basis.

The Glen Ferris property of the Oakland Coal Co. has been sold to the Rich Creek Coal Co. of Fairmont, for \$375,000. The property comprises 1,512 acres and is located on the Kanawha & Michigan R.R. in the Kanawha district. The Rich Creek Company is a subsidiary of the West Virginia Coal & Coke Co., which was recently reorganized when the Main Island Creek Coal Co., the Logan Mining Co. and the Rich Creek Coal Co. were merged.

John Whelan, Jr., of Cleveland, Ohio, has been appointed general manager of the mines of the Brady-Warner Coal Corporation, the offices of which are in Fairmont. Mr. Whelan will have charge of operation and production of coal, and he will spend most of his time at the mines. His office will be in Fairmont.

Owing to frequent interference by representatives of the union and recent explosions at its plant the Bar-Jay Coal Co., operating in Barbour County, has obtained from Judge Warren B. Kittle, of the Barbour Circuit Court, a temporary injunction most sweeping in its terms.

Net profit of the Elkhorn Coal Co., in 1924 was \$38,445 after taxes, depreciation, and interest, a decrease of \$129,856, compared with 1923, equivalent to 29c. a share \$50 par share on \$6,600,000 preferred, compared with \$1.27 per share the previous year. Gross earnings for the year were \$3,840,135, compared with \$4,689,375 in 1923. Profit and loss surplus as of Dec. 31, 1924, was \$894,463, an increase of \$15,259 over the previous year.

CANADA

The city of Fernie, British Columbia, is beginning to assume its old-time activity; 128 coke ovens are now in operation and others are being warmed up. It is stated that there is an active demand for both coal and coke from the Crows Nest coal field and that the majority of the mines now are working full time.

A delegation from Cape Breton at Ottawa to request that the import duty on coal from the United States be increased from 14c. to 53c. a ton, was told by Premier MacKenzie King March 18 that no government would be justified in taking such action to relieve a purely local situation.

The United Mine Workers executive committee, it was reported at Sydney, N. S., March 16, has decided to advise the Provincial Government that it is prepared, under direction of the gov-

ernment, to place maintenance men in the mines now on strike in the Cape Breton coal area.

Sale of the fixed assets and good-will of the Ogdensburg Coal & Towing Co., Ltd., Montreal, to Alfred Rogers, of Toronto, well-known coal operator, was announced March 12 by Dr. W. L. McDougald, president of the Ogdensburg company, of which he was also practically the sole owner. It is understood the sum involved in the sale is upwards of \$1,000,000. The transaction means the retirement of Dr. McDougald from the coal trade of Canada, in which for a number of years he had been one of the country's largest operators. Mr. Rogers has already been identified for many years with large coal and other interests in Toronto.

Traffic

Virginian Ordered to Put Rates To West in Effect

The Interstate Commerce Commission has ordered the Virginian Ry. to put into effect the New River rates on coal for western shipments on that road; thus a settlement of a long drawnout controversy between shippers and the road seems to be nearing its end.

Several years ago W. P. Tams, Jr., president of the Gulf Smokeless Coal Co., and several other shippers on the Virginian Ry. started proceedings to compel the Virginian to give through freight rates west. At that time the operators of the Winding Gulf district were divided on the question, many claiming that the prosperity of that district was attributable to the fact that the Virginian was able to keep its equipment on its own rails and provide a constant car supply for coal moving to the piers at Hampton Roads. Since the suit was started, however, the railroads have more equipment, and the question of car supply does not enter so largely into the case. Tide-water business today is not so prosperous and to those shippers that have Virginian connections only the question of being able to move some of their tonnage west may be of great benefit.

Whether the Virginian Ry. will be able to move much coal west is a question. The road was originally conceived and built to carry coal to tide-water only. Piers and terminal facilities among the largest and best in the world have been provided for this business and the largest and boldest scheme of classification by any road is now being worked out to take care of the coal business at Hampton Roads. The railroad has given no thought to hauling coal west by way of Deepwater. Tracks are not in shape and several hills will have to be climbed in moving coal in that direction. The real way for the Virginian to move tonnage west is down the Guyan river by way of Elmore. Whether or not the interests controlling the Virginian will eventually build below Itmann and close the gap of 50 miles between their rails and Gilbert, on the C. & O., is a question for future settlement.

New Companies

The Borden Fuel Corporation has been incorporated at Birmingham, Ala., with a capital of \$25,000, to engage in coal mining and the handling of coal and its products. The company may begin operations when \$12,500 is paid in. Officers designated are I. N. Skelton, president; C. W. Landrum, vice-president, and C. R. Atkins, secretary.

The Fort Ridge Mining Co., at Madisonville, Ky., capital \$10,000, has been chartered by Tom Logan, E. B. Hamblett and William Robertson.

The North Floyd Coal Co., Prestonsburg, Ky., capital \$25,000, has recently been chartered by L. B. Johnson, C. Y. Ligon and William Blackburn.

Starco Coal Co., Sullivan, Ind., has been organized with 1,000 shares, of no par value, to engage in mining. The directors are Wilbur A. Gorman, William S. Campbell, Ward H. Watson, Jessup F. Bolinger and Edward B. Shapker.

Trade Literature

American Sirocco Fans and Blowers. American Blower Co., Detroit, Mich. Bulletin No. 1801. Pp. 71; 8½ x 11 in.; illustrated. Describes fans and blowers and contains numerous tables of capacity, shipping weight, etc.

Welding Electrodes. General Electric Co., Schenectady, N. Y. Pp. 15; 3½ x 6 in.; illustrated. Describes the characteristics and applications of the three types of General Electric electrodes, designated as types A, B and C.

Coming Meetings

Upper Potomac Coal Association. Annual meeting April 6, Cumberland, Md. Secretary, J. F. Palmer, Cumberland, Md.

Canadian Retail Coal Association. Annual convention, King Edward Hotel, Toronto, Ont., Can., April 8 and 9. Secretary, Bert A. Caspell, Brantford, Can.

National Retail Coal Merchants Association. Annual convention Traymore Hotel, Atlantic City, N. J., May 11-14. Resident vice president, Joseph E. O'Toole, Transportation Bldg., Washington, D. C.

The American Society of Mechanical Engineers. Spring meeting, May 18-21, Milwaukee, Wis. Secretary, C. W. Rice, 29 West 39th St., New York City.

Mine Inspectors' Institute of America. Annual convention, Jefferson Hotel, Peoria, Ill., May 19 and 20. Secretary, G. B. Butterfield, 179 Allyn St., Hartford, Conn.

Chamber of Commerce of U. S. A. Thirtieth annual meeting, May 20-22, Washington, D. C.

Manufacturers' Division of the American Mining Congress. National exposition of coal-mining equipment, Cincinnati, Ohio, week of May 25. Secretary of American Mining Congress, J. F. Callbreath, Munsey Building, Washington, D. C.

National Association of Purchasing Agents. Tenth annual convention, Milwaukee, Wis., May 25-28. Secretary, W. L. Chandler, Woolworth Building, New York City.

American Wholesale Coal Association. Ninth annual convention, French Lick Springs Hotel, French Lick, Ind., June 1 and 2. Secretary, G. H. Merryweather, 1121 Chicago Temple Bldg., Chicago, Ill.

Illinois & Wisconsin Retail Coal Dealers' Association. Annual meeting, June 9-11, at Lake Delavan, Wis. Secretary, I. L. Runyan, Great Northern Bldg., Chicago, Ill.

Mid-West Retail Coal Association. Annual meeting at Kansas City the first half of June. The exact date will be decided upon soon.

National Coal Association. Annual meeting, June 17-19, Edgewater Beach Hotel, Chicago, Ill. Executive Secretary, Harry L. Gandy, Washington, D. C.

American Society for Testing Materials. Twenty-eighth annual meeting, week of June 22, Chalfonte-Haddon Hall, Atlantic City, N. J. Secretary-treasurer, C. L. Warwick, 1315 Spruce St., Philadelphia, Pa.

Chemical Equipment Exposition. June 22-27, Providence, R. I. Association of Chemical Equipment Manufacturers, 1328 Broadway, New York City.

New Equipment

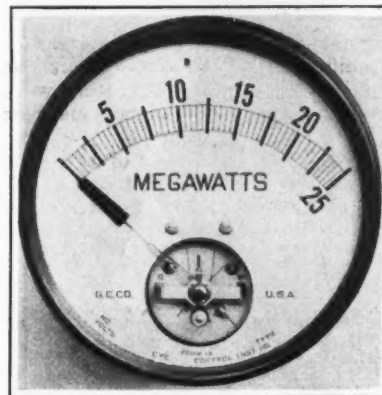
Meters Adapted to Latest Circuit Requirements

Three new types and two improvements to existing types are among the recent developments in meters and instruments marketed by the General Electric Co. The new devices are a totalizing watt-hour meter; a three-element, four-wire, three-phase watt-hour meter and a complete line of alternating- and direct-current switchboard instruments. Improvements include a modified terminal assembly for three-wire, single-phase watt-hour meters and a new contact device for watt-hour meters when used with demand meters.

The new totalizing form of watt-hour meter is designed to meet special problems, such as the determination of the combined maximum demand of completely separate circuits. These meters are made up of the elements of four standard watt-hour meters arranged in two groups of two meters each. Each group acts on one shaft and the motion of the two shafts is transmitted to the totalizing register through suitable gearing. Such a meter will totalize four separate polyphase circuits and may be used on either three-wire, three-phase or four-wire, three-phase systems.

The three-element, four-wire, three-phase watt-hour meter was developed to provide a device which will not be dependent on a balanced condition of voltage for correct registration.

The new line of switchboard instruments embodies a round-pattern device 7½ in. in diameter, with an unusually long and open scale. The complete group includes alternating- and direct-current ammeters and voltmeters; single-phase and polyphase wattmeters, power-factor and frequency meters, and synchronism indicators.



Meters That Can Be Read Easily

These instruments when connected to suitable transformers may be used to give indications of line conditions at places distantly remote from the electric circuit.

A modified terminal assembly has been developed, comprising six separate terminals assembled in a single, removable terminal block. The object of this development is to provide separate excitation of the potential circuit of three-wire, single-phase meters from a source ahead of the fuses. The potential circuit is connected to two outside terminals and current coil connections are made to four inner terminals. The size and contour of the standard base is not changed.

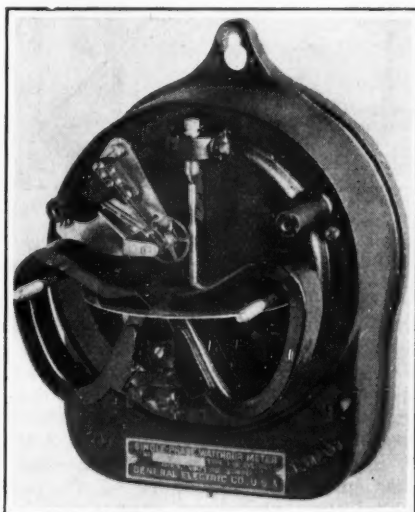
FRICTION REDUCED TO MINIMUM

For the purpose of reducing friction, simplifying adjustment of contacts and facilitating inspection, a new contact device has been developed for watt-hour meters used in connection with demand meters. Construction details include the cutting of an additional worm in the disk shaft of the watt-hour meter and the mounting of contact parts on a separate bracket to be attached directly to the base of the meter. By using either a single, double or quadruple worm on the shaft it is possible to use the same contact device for each of the three time intervals; namely 15, 30 or 60 minutes. Friction in the new contact device is reduced to a minimum, and variation in friction throughout a cycle of operation of the cam is minimized.

A Transformer Telltale

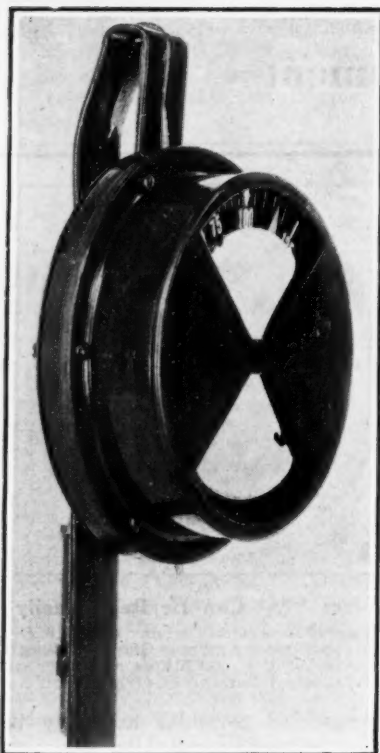
A load-indicating device for distribution transformers which compensates for ambient temperature, is a recent development of the General Electric Co. The need for such an instrument has long been felt by the distribution engineer, for up to this time there has been no practical way to keep reliably informed as to load conditions on distribution transformers. The device is to be known as the Type A thermotell.

This instrument consists fundamentally of two thermometers connected in series. The first thermometer is ac-



Device Records Loads

The growing necessity for demand indications has prompted the development of this new contact device for single phase watt-hour meters.



Does More Than Keep Tabs on the Temperature

The increase in temperature which an electrical device will safely withstand depends upon the temperature around it. This little instrument compensates for such conditions.

tuated by the heat of the oil at the top of the transformer, and the action of the second, which is located in the ex-

ternal case, is controlled by the ambient temperature and modifies the reading of the first.

The composite reading indicated by a pointer closely approximates the internal coil or hot-spot temperature and, for convenience, is given as a percentage of the equivalent load. This is the percentage of the safe continuous output of the transformer, represented by the load cycle causing the load.

INDICATES OVER OR UNDERLOAD

The dial is calibrated from 50 to 125 per cent equivalent load, indicating either underloaded or overloaded transformers. A semaphore is tripped by the mechanism, and swings into view when the instrument registers more than 100 per cent, equivalent load.

If the reading is in excess of 100 per cent it shows that the transformer is too small and that it has carried a continuous load, or a short-time overload, equivalent to such a load, sufficient to bring the internal winding temperature to 100 degrees C. or higher.

A resetting lever extends below the external case and, upon being reset, the instrument indicates the then existing load conditions which are acting on the transformer.

Other important features of this instrument are the ease with which it is installed, it being necessary only to lift the cover and slip the supporting arm over the edge of the tank; and the ambient correction which takes into account all variations in ambient temperature will be made automatically. The instrument is suitable for use on a wide range of 60-cycle, pole-type, distribution transformers.

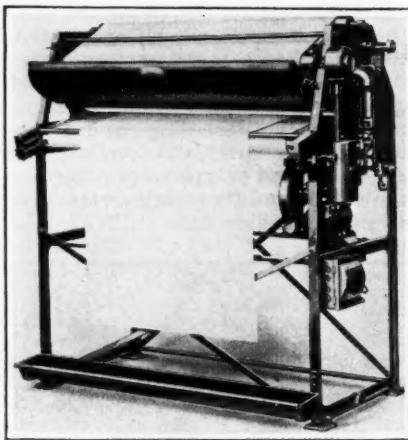
This Will Dry a Blueprint Without Wrinkling It

Under some conditions, it is difficult to dry blueprints swiftly and without wrinkling the paper. A sheet drier built to overcome these handicaps is illustrated herewith. This machine, possessing a number of new features, is intended to dry 8 lin.ft. of dripping wet prints a minute without causing a wrinkle. The traveling apron on which the wet prints are placed, is slanted slightly downward, thus allowing all the surplus water to drop into the tray provided below the machine. This prevents the water from collecting where the cylinder and belt meet, thus removing one of the causes of wrinkling. Squeezing is unnecessary.

NO SCORCHED BELTS

Another feature is the patented thermostatic control which is used only on gas-heated driers. This new drier is furnished with an asbestos apron, which eliminates the difficulty of scorched belts. The apron is run into the machine completely around the cylinder the moment the machine is stopped and provides ample protection for the belt while the heated cylinder is cooling off.

An unique feature of the machine is the copper cylinder which heats up quickly, retains the heat longer than ordinary rolls. Prints will not adhere to these rolls but peel off automatically without the use of a finger arrange-



No Wrinkles About This

The water that is not wiped off by the traveling apron is dried out by a gas heater controlled by a thermostat.

ment or any special attachment. The copper cylinder will not rust.

The machine is manufactured in two sizes—22-in. and 45-in. The 45-in. machines are provided with a gear which gives two ranges of speed—4 and 8 ft. per minute—whereas the 22-in. machines have but one speed—4 ft. per minute. Cut gears are used throughout. These gears are properly protected to meet factory inspection. Ball bearings are also used throughout. The machine is operated by a 1/4-hp. motor. This drier is made by the C. F. Pease Co., 863 North Franklin St., Chicago, Ill.

Publications Received

Giant Power. Report of the Giant Power Survey Board to the General Assembly of the Commonwealth of Pennsylvania. Pp. 480; 6 x 9 in.; illustrated. Among some of the subjects discussed are mine-mouth power plants, gasoline from coal, coal pre-treatment, anthracite culm, water-power development, cost of electric current, etc.

The Valley Coal Fields of Virginia, by Marius R. Campbell and others, prepared in co-operation with the U. S. Geological Survey with a chapter on *The Forests of the Valley Coal Fields of Virginia*, by Fred C. Pederson, prepared in co-operation with the Office of State Forester. Virginia Geological Survey, University of Virginia, Charlottesville, Va. Bulletin No. XXV. Pp. 322; 7 x 10 in.; illustrated. Geologic map of the Valley coal fields in Montgomery, Pulaski and Wythe counties, Va., accompanies the bulletin.

Detailed Report on Mineral and Grant Counties, West Virginia, by David B. Reger, assisted by other members of the staff of the West Virginia Geological Survey, Morgantown, W. Va. Pp. 866; 6 x 9 in.; illustrated. The report is accompanied by a separate case of topographic and geologic maps, each county being mapped separately. Price (delivery charges prepaid), \$3.25.

The West Virginia Geological Survey announces a new topographic map of **Ohio, Brooke and Hancock Counties, West Virginia.** This new map was made necessary as many calls for it have been made since the exhaustion of the former supply. Price, 75c.

The following publications have been issued on coal-mining investigations under the auspices of Carnegie Institute of Technology, U. S. Bureau of Mines and Advisory Board of Coal-Mine operators and Engineers: **Correlation of Coal Beds of the Allegheny, Formation of Western Pennsylvania and Eastern Ohio**, by Reinhardt Thiessen and Ford E. Wilson. Bulletin 10. Pp. 56; 6 x 9 in.; illustrated. Price, 40c. **Efficiency in Blasting Coal: Production of Lump Coal**, by J. E. Tiffany and C. W. Nelson. Bulletin 11. Pp. 48; 6 x 9 in.; illustrated. Price, 50c. **Use of Carbon-Monoxide Gas Masks in Mines**, by S. H. Katz, G. S. McCaa and A. L. Barth. Bulletin 14. Pp. 76; 6 x 9 in.; illustrated. Price, 40c.

Recent Patents

Drill Bit; 1,515,434. George H. Gilman, Claremont, N. H., assignor to Sullivan Machinery Co., Chicago, Ill.

Safety Suspending Apparatus for Mine Cages and Lifts; 1,515,452. Samuel Webb and Horace Cromwell Guest, Dudley, England. Nov. 11, 1924. Filed Feb. 1, 1924; serial No. 690,066.

Air Spiral; 1,515,965. Frank Pardee, Hazelton, Pa. Nov. 18, 1924. Filed Oct. 25, 1922; serial No. 596,707.

Coal-Loading Machine; 1,516,435. John W. Houghton and Thurston W. Mitchell, Huntington, W. Va., assignors to Steel Products Co., Huntington, W. Va. Nov. 18, 1924. Filed Dec. 3, 1920; serial No. 428,077.

Spiral Conveyor and Chute; 1,515,890. Lee E. Sekulski, Ellwood City, Pa., assignor to Mathews Gravity Carrier Co., Ellwood City, Pa. Nov. 18, 1924. Filed March 24, 1920; serial No. 368,298.

Fuse Holder; 1,517,385. Albert W. Snedden, Brookville, Pa. Dec. 2, 1924. Filed Feb. 15, 1924; serial No. 693,067.

Steel Mine Tie; 1,517,963. William S. Dodson, Springfield, Mo. Dec. 2, 1924. Filed Feb. 25, 1924; serial No. 695,041.

Mine Drill; 1,518,250. J. W. Campbell, Wendel, Pa. Dec. 9, 1924. Filed Jan. 12, 1923; serial No. 612,235.

Mining Apparatus; 1,518,333. Nils D. Levin, Columbus, Ohio, assignor to the Jeffrey Mfg. Co., Columbus, Ohio. Dec. 9, 1924. Filed April 19, 1921; serial No. 462,726.

Mining Machine; 1,518,809. Edmund C. Morgan, Chicago, Ill.; Olive E. Morgan executrix of said Edmund C. Morgan deceased. Dec. 9, 1924. Filed July 6, 1914; serial No. 849,018.

Mining and Loading Machine; 1,519,147. Nils D. Levin, Columbus, Ohio, assignor to the Jeffrey Mfg. Co., Columbus, Ohio. Dec. 16, 1924. Filed Oct. 22, 1910; serial No. 588,471. Divided and this application filed Aug. 1, 1919; serial No. 314,740.